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SUSTAINABLE DEVELOPMENT OR THE WILL TO POWER? THE EUROPEAN UNION AND FINLAND PURSUING ENVIRONMENTAL POLICY

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ABSTRACT

The interaction between the European Union and Finland in environmental policy is studied from different perspectives including rationality, power, and social and economic consequences. While this interaction has its own peculiarities, the general features of environmental policy outcome are similar throughout the western world.

Different approaches have been developed in this study to estimate the magnitude of environmental impact. Among these is an open ended environmental impact scale that measures environmental impacts in square kilometers and years. A number of case studies show how important environmental issues are confused with minor problems or risks.

Why does this happen? The effects of environmental psychology and manipulation are discussed in depth. The roles of research institutes, mass media, environmental movement and professional groups, all looking after their own interests, are considered.

Elemental particles are not disappearing and energy is plentiful. What exactly, apart from climate change, threatens the well-being of present and future generations in Finland and Europe? What are the magnitudes and emergencies posed by environmental threats compared to conventional threats such as economic collapse or military conflicts?

It is argued that Europe's political and administrative environmental elite deliberately circumvent scale issues and cost benefit analyses with the sustainable development ideology. A rational approach would upset bureaucratic structures and reduce their scope of power exercise. This is considered in terms of fragmentation of decision-making and power theory.

From economic perspective, environmental policy is shown to have serious implications. A healthy economy needs an efficient permitting process and a rational justice system. The new policy approach has created a jungle of legislation that prolongs permitting processes and allows capricious interpretation of laws by officials. By placing those engaged in productive activities at the mercy of the bureaucracy, Europe is pushing jobs and prosperity elsewhere.

This study proposes new methods to increase the quality and accountability of decision making in environmental policy. However, the core problem is found to be the combination of power and cognitive dissonance. Even when confronted with overwhelming evidence, erratic policies are pushed through. This happens because the elite do not want to surrender power capital back to administrative subordinates and face accountability for past actions.

A change in the system of governance is needed to deal with the ever-increasing body of legislation and bureaucracy burdening the people of Europe. Splitting a new independent entity from the EU Commission and European Parliament is suggested for consideration. It would have the duty of protecting the subsidiarity principle and producing independent and critical reviews of policy outcomes. It would be given the sole power and the hard job to rid the system from unnecessary or harmful policies, legislation and bureaucracy.

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FOREWORD

Finland experienced a severe recession as a result of banking crises in early 1990s. Hundreds of thousands of people found themselves without jobs. Many lost all their property. While the banks were saved, 60,000 people were left in a long term debt trap.

In the middle of the recession Europe's second largest pulp producer Metsä-Botnia was planning a pulp mill investment in Rauma. Permitting was handled effectively and rationally. An investment decision was made. The project started to radiate work and prosperity to the hard hit Finland's west coast area. This could be seen as a turning point from the recession.

Finland joined the European Union in the beginning of 1995.

Now Europe and Finland seem to be heading towards rough times. Unfortunately productive investments that could help us out have become difficult to make. Project permitting processes have become burdensome and time consuming. The body of environmental regulations has ballooned. The capricious application of environmental rules has become an issue for those engaged in productive activities.

An effective and rational justice system is important for a healthy economy. Timing is a key factor for investment activity. The last place an investor wants to be with a project is ensnared in a regulatory bramble watching his money burn with only a vague clue on how to untangle himself and escape across a minefield of unmanageable risk. European environmental bureaucracy is one reason why those investing in productive activities are looking elsewhere. Jobs and prosperity are disappearing.

I am a McGraw-Hill science author and I hold a doctorate in engineering. My work as an independent consultant focuses on coastal, off-shore and arctic engineering, as well as on environmental impact assessment. I approach problems from an analytical perspective and my professional views are the result of broad international experience.

Since childhood, I have also been an avid hiker, fisher and bird-watcher. I find nature a wonderful source of inspiration. Yet in the forty-odd years I have rambled around this country, the actual environmental changes caused by people seem generally modest and for the most part positive. The nature is cleaner and richer and the number of bird species I encounter has increased. Generally speaking, the Finnish environment is in better shape than it was forty years ago.

Given my personal experience, I initially was confused as it became increasingly frustrating to work with environmental officials, who would take miniscule environmental details and blow them up into major issues. Strange interpretations of new environmental legislation and guidelines trumped simple arithmetic and common sense as administrative subordinates where forced into submission.

In my naivety, I spent years trying to educate the bureaucrats on the relative magnitude of environmental issues and their significance to nature's own processes. These efforts fell on deaf ears – something that made little sense, given that under both EU law and Finnish law, the proportionality principle is a cornerstone of environmental legislation. And Finland prides itself on being a justice society.

John Kenneth Galbrait's book *The Anatomy of Power* made a big impression on me. The psychological and sociological processes underlying bureaucratic thinking and the exercise of power explained to a large degree what was happening in environmental policy. At issue is not the rational pursuit of the common good, but rather a gold rush mentality among environmental politicians and bureaucratic institutes staking claims in a new emerging sphere of power.

Environmental matters of huge importance to us such as climate change are deliberately conflated and confused with minor issues. Science institutions and mass media contribute to this process because it serves their interest also. The costs and other harms inflicted on direct victims of power abuse, on society, and on third parties have so far been largely ignored.

During the last five years much of my spare time has been devoted to studying the literature on social psychology and power and analyzing developments from this perspective. There was no shortage of material. Finnish mass media was a rich source of manipulation examples. Concrete cases of power abuse and violation of the proportionality principle kept pouring into my office.

The first revision of this study was published in Finnish in 2007. It was received with great enthusiasm. Finally somebody stood up and focused on the madness of environmental bureaucracy. People also pointed out, that other bureaucratic branches exhibited similar symptoms.

There were also different kinds of voices. Some people working in public administration, in the environmental science community and in the green movement considered me as a man following his own path or one with a mindset focused on economic values only with no respect for ecological values. I was even branded a conspiracy theorist.

Others questioned who has financed this effort. They found it difficult to believe that somebody would go to so much effort – and risk the career consequences – simply in pursuit of scientific inspiration and of love for freedom and justice.

In complicated issues like environmental policy, there is no single objective truth but many sides of the truth. This report examines environmental policy from a perspective that has been largely suppressed in Western and especially in the Nordic democracies as politically incorrect.

I do not see myself a conspiracy theorist. Instead I have trust in the lessons of sociology. History is rich with examples of how manipulation, guilt and ideology have been used to distort reality for the concentration of power. There is a need for reasonable forward-looking behavior and acting in a responsible manner. However, the ideology of "sustainable development" is used to submit us to irrational acts of power.

Democracy requires constant vigilance of our own beliefs as well as a willingness to publicly and openly confront the most difficult challenges facing our society. It is the goal of this work to inform average citizens, politicians, administrators, scientists, and the business community on the relative magnitude of the environmental impacts of various phenomena, measures and activities.

My hope is that this book will generate discussion and rise awareness of how we are manipulated. Perhaps this will help us to concentrate our limited resources on managing the most significant environmental problems in a rational, cost-effective way and put aside the less important issues and turf wars. I also seek to offer a path to reducing the regulatory and bureaucratic burdens now imposed for minor environmental issues.

However, making real difference would require changing the system. More specifically Europe and Finland should find ways to deal with excessive concentration of bureaucratic power and cognitive dissonance, i.e. the tendency of our political and administrative elite to turn policy errors into mistakes. I am not optimistic, though. The present setting is very good in serving the narcissistic needs of those with real power and in blurring their accountability. The great opportunities of European co-operation are turning into a bureaucratic burden on its people.

I would like to wholeheartedly thank the many public officials, experts and friends who have offered their insights and experience at all stages of this decade long research effort. I am also grateful to those who have pushed me to deepen and refine my original premise. They are too many to mention. Finally I thank Greg Moore for editing help, Pietari Visanti for artistic design of the figures and Leena-Marjut Rautio for technical production assistance.

Espoo September 15, 2008 Esa Eranti

1. ENVIRONMENTAL ISSUES AS AN ARENA FOR THE EXERCISE OF BUREAUCRATIC POWER

Disasters of imagination

The Port of Naantali sits at the heart of an industrial center on the southwestern coast of Finland, ringed by an oil refinery, a coal-fired power plant, grain silos, a shipyard, and a host of industrial infrastructure.

In the early 1990s, the City of Naantali, in cooperation with the local business community, undertook an ambitious plan to develop its port area to promote commerce and create jobs. The project called for the dredging of 560,000 m^3 of harbor bottom sediment, mostly virgin clay.

The permitting process for the harbor dredging started in 1995 (see Appendix 1). A permit was granted in 1996, only to be disputed on the grounds of ostensibly high concentrations of contaminants measured in sediment samples. Dredging of the channel to the repair yard was performed in 1998–1999 under an older permit.

In the meanwhile, guidelines for the dumping of dredging spoils were somehow lifted from the OSPAR Convention covering the Northeast Atlantic and the North Sea and incorporated into the Convention of the Protection of the Marine Environment of the Baltic Sea (HELCOM). Finland's environmental administration then referred to these guidelines when it demanded a monitoring study of the impacts of this minor dredging operation. The new study detected traces of tributyltin (TBT), an antifouling agent used in paints for ships and other vessels, in the topmost sediment layer near the mouth of the shipyard basin.

While most aspects of the dredging permit were readily resolved, the phrase "significant amounts of tributyltin" crept first into the correspondence of official agencies, including the Finnish Environmental Institute, the Turku environmental board, the fisheries unit for the Southwestern Finland Employment and Economic Development Centre, and then into lead stories in the local press. Concerns over TBT led to several rounds of rejection and appeal of the permit application.

In 1999 and 2000, the City of Naatali presented expert findings to Finland's Supreme Administrative Court along with statements from the environmental administration. The sediment dredged from the channel (about 100,000 tons dry weight) contained a total of about 400 grams of TBT and TBT content in the dredged sediment averaged about 4 μg/kg of dry weight solids. This average concentration was an order of magnitude below typical TBT concentration of surface sediments in Finnish harbor basins and channels, as well as two orders of magnitude below the limit value for organotins (612 μg/kg of dry weight) applied at the time for sediments in Germany and the Netherlands.

Indeed, the amount of TBT suspended into the water during a couple of months of dredging and dumping activity in the harbor area were equivalent to the legal TBT emissions from a grain ship sitting in the same harbor just for a couple hours (Appendix 2).

At first glance, one might conclude that Finland's environmental administration was merely a zealous adherent to the precautionary principle. However, this view reconciles poorly with the parallel case of the contamination of the Kymijoki River in eastern Finland.

The Kymijoki incident resulted from an industrial explosion in 1960 that released some 20 kilograms of dioxins and furans (PCCD/DF) into the river. Most of the PCCD/DF compounds initially settled in the sediment below the Kuusankoski rapids. The highest measured concentration in the sediment ran as high as 350,000 ng I-TEq/kg (international toxic equivalent quantity). Over the decades, these toxic compounds have been washed downstream into the Gulf of Finland with the sediment.

The Kymijoki River annually deposits about 60,000 tons of suspended solids with a PCCD/DF content of 2,300 ng I-TEq/kg into the Baltic Sea /74/. This concentration is over four times above the limit of 500 ng I-TEq/kg set by the environmental administration.

Comparing the environmental impacts of toxic compounds in suspended solids in the case of Naantali Harbor and the Kymijoki River, we get:

	Kymijoki River	Naantali harbor dredging
Suspended solids	60,000 tons/year	6,000 tons total
Duration of impact	48 years to date	2 months
Harmful substance content	>4 times the limit value	0.01 times the limit value

In other words, the dioxins and furans in the suspended solids from the Kymijoki River flowing into the Baltic in a single year constitute an environmental impact over 4,000 times greater than the TBT release from the Naantali harbor dredging. Adding in the durational dimension, the Kymijoki incident has already had an impact roughly 200,000 times greater than the proposed Naantali harbor dredging might have had.

The City of Naantali had to pay about €100,000 for studies of the potential impacts of the dredging operation. Some of the studies had no relation to the project's impacts (e.g. assessment of fish stocks outside the area affected by dredging). The hardly surprising finding was that no impacts from dredging could be detected. Even if there had been detectable impacts, the specific effects of dredging could not have been differentiated from other sources using the methods applied.

Finland's Ministry of the Environment is legally responsible for dealing with the Kymijoki dioxin problem. The Ministry and the Finnish Environmental Institute spent about €200,000 on the KYPRO research project into the Kymijoki problem during the years 1996 to 1998. However, to proportionally match the assessment response that officials required of the City of Naantali, the state would have had to expend around €800 million a year.

The costs of remediating the Kymijoki dioxin-furan spill were studied in the planning for the Kymijoki Canal Project. Remediation budgets begin at around €10 million depending on the strategy selected. All proposed remediation techniques are familiar and in wide use. Rather than move ahead, however, the environmental administration has sat on the matter for over a decade. During that time, over 600,000 tons of polluted suspended solids has drifted into the Baltic Sea.

The environmental administration's distinctly different responses to these environmental regulation issues suggests it applies different criteria when the problem lies within its sphere of responsibility and when there is the possibility for compelling others to pay.

There is another aspect to the environmental administration's inaction in the face of decades of PCCD/DF contamination. The Kymijoki River has yet to manifest signs of ecological catastrophe or consequences for human health. Current science suggests that limit values for dioxins and furans in sediments may be overly cautious as these substances, when attached to sediment particles, possess low bioactivity. Whether this applies in the specific instance could readily be resolved in bench-top laboratory studies.

While the Kymijoki case remains open, the Naantali case is essentially moot. Upon receiving the expert statement commissioned by the City of Naantali in 2000, the Supreme Administrative Court ducked the issue by remanding the dredging permit decision to the West Finland environmental permit office. The court noted merely that that the 1996 permit was issued without sufficient information of TBT and polycyclic aromatic hydrocarbons (PAH) compounds, the boundaries of the impacted area, and the suitability of the dumping site.

When the West Finland environmental permit office finally issued a dredging permit in 2004, it generated a further appeal by the Western Finland environmental center and the fisheries unit of the Southwestern Finland Employment and Economic Development Centre. In 2006 – more than eleven years after the permit application was submitted – the Vaasa administrative court finally cleared the permit.

Of course, the ambitious port development plan of the City of Naantali and its partners already died long before the permitting process was completed. The money and time invested in the project was lost, no jobs were created. In the end, the project had diminished from a major development project to a mere 50,000 m^3 maintenance dredging effort.

Framing the inquiry of this book

Finland's mass media, based in Helsinki, devotes considerable space to environmental topics such as climate change, pollution, eutrophication, resource depletion, mountains of waste, recycling, environmental protection, environmental crime, and the state of the environment. Within this cacophony, it is virtually impossible for an average person to judge the relative significance of these issues.

Even the notion of what makes a good environment is hard to agree upon. People tend to form their views and positions based on vague images. Most people are ready to use environmental arguments to promote their own views and interests. They are happy to eat the lunch when somebody else is paying.

But in reality, how serious is the threat that we or our descendents will succumb to a toxic dystopia? Will we drown in mountains of waste? How likely is the loss of our ecological inheritance? And what is the magnitude of the ecological threats we face compared to the social, economic, and military threats?

Whether the environmental threats are real or imagined, the regulatory burden of environmental policy grows heavier as new rules are added at all bureaucratic levels. Given the potential for perverse incentives and outcomes that violate the long-term interests of the society, the lack of attention paid to the distorting effects of environmental regulation is somewhat surprising.

"Environmental justice" is a new term used in environmental circles as a justification for the assertion of authority and power. But whence is such power derived? What is the basis for exercising such power?

In this study, we analyze environmental policy in the context of bureaucratic thinking and the mankind's never-ending struggle for power and resources. In addition, we consider the effects of environmental policy on the economy and fundamental rights of Finnish citizens. Finally, we outline a roadmap to rational environmental policies that might benefit society as a whole.

As a matter of fact we are not talking about Finland alone. We are talking about the outcome of Finland's interaction with European Union in the field of environmental policy. Furthermore, the issues discussed in this study repeat themselves in a very similar manner all over Europe and the Western world. While we are analyzing examples from Finland, we are actually talking about a sociological problem that is threatening the well being of present and future European generations. That problem is the build-up of unjustified bureaucratic power.

The need for assessment of scale in environmental issues

Article 2 of the consolidated version of the Treaty Establishing the European Community (Treaty of Rome) lists its goals. It now reads:

> *Article 2*
>
> The Community shall have as its task, by establishing a common market and an economic and monetary union and by implementing common policies or activities referred to in Articles 3 and 4, to promote throughout the Community a harmonious, balanced and sustainable development of economic activities, a high level of employment and of social protection, equality between men and women, sustainable and non-inflationary growth, a high degree of competitiveness and convergence of economic performance, a high level of protection and improvement of the quality of the environment, the raising of the standard of living and quality of life, and economic and social cohesion and solidarity among Member States.

These goals are often in conflict with each other.

When Finland began to implement new environmental policies largely based on EU directives and international environmental agreements, conflicts arose that violently pitted environmental values against other fundamental rights in the society. The Naantali harbor development project is only one example.

For example, nearly half of the area of Finnish Lapland is now classified as protected. The protection decisions were made in Helsinki and Brussels, and overlooked the unemployment and social distress common to residents of Lapland. The fight for further protection of

Lapland's supposedly primeval forests takes place far away, is based on manufactured images, and infringes on local people's right to make a living.

In southern Finland, burdensome permitting processes and ambiguous environmental standards have increasingly become impediments to industrial activity and infrastructure development. This reflects gradually on work opportunities, incomes and quality of life.

A great deal of new environmental legislation and administrative practices are currently under development to regulate social and private-sector activities. Ecoideology is invading many aspects of endeavor, from industrial production, consumption, agriculture, forestry and construction to consumption, waste management, and transportation. It is starting to have an increasing influence on our freedom to choose where and how we live our lives.

It would be beneficial if the magnitude of environmental impacts and other ecological issues could be evaluated in a common-sense manner. Situations could be compared against each other and the desired environmental benefit compared to the costs of achieving it. Conflicts could be resolved and legislation could be developed in a rational and balanced manner. Companies could focus their core activities and marshal their resources for lowering environmental impact in a cost-effective way. People would be protected from bureaucratic excess. They would have a concrete basis in forming their views on environmental matters.

Above all, by quantifying environmental issues the European Union and our own societies would have a rational basis for focusing on the essential and for seeking balances between environmental and other goals.

2. ESTIMATING THE SIZE OF ENVIRONMENTAL IMPACT

Finding real-life analogs to environmental issues and assessing potential impacts can be fairly straightforward when there is an appropriate frame of reference.

Finland's cultivated lands, traffic network, basic production infrastructure – even its cities – are largely a legacy of development in the 20th century. Not only is Finland's rapid emergence as a technologically advanced society a recent event, so are most of its environmental emissions. In the more populated parts of Europe this development has occurred over a longer time span and has been more intense.

There is extensive experience with environmental impacts associated with human activity. In many cases environmental impacts and risks can be easily assessed in light of decades of accumulated knowledge.

Consider, for example, the well-documented release at the Kaukas pulp mill, owned by the UPM-Kymmene Corporation. During June 2003, untreated waste water was inadvertently released from the mill located in eastern Finland. The release received extensive media coverage and was repeatedly deplored by the national media and environmental bureaucrats as the worst environmental disaster of the pulp and paper industry in decades. Russia, which had routinely taken harsh criticism from Finns about its handling of environmental matters, was suddenly demanding Finland never allow such a mistake to occur again.

The buried lede in newspaper accounts was that the water area strongly affected by the release was limited to just a few square kilometers of the lake and part of the Saimaa Channel. Ironically, the press was also giving coverage that summer to massive blue-green algae blooms covering more than a thousand square kilometers of eutrophied waters in the Gulf of Finland.

Available figures suggest the uncontrolled release from the Kaukas mill lasted less than a week and resulted in an overall additional oxygen demand (chemical oxygen demand and biological oxygen demand, COD + BOD) of about 3,400 tons, or 1.7 % of Finland's total accounted oxygen demand. The release peaked at 560 tons for a single day and the daily average release during June was 90 tons. The maximum daily average permitted at the time was 75 tons in a month.

Examination of existing records and discussions with water-quality experts suggest that just two decades earlier, the total oxygen demand for waste-water releases in Finland was about ten times higher than in 2003. In other words, Finland experienced several decades when the daily discharge from its pulp and paper mills was as high as a week of emissions from the Kaukas pulp mill at the height of its environmental emergency.

Many Finns still remember the days when the water near pulp and paper mills was clouded and foamy. Fish caught in nearby waters often had a funny aftertaste. Although the situation was far worse then, it was never described as a disaster. People went on with their lives and prospered. There are no reports of wide scale permanent damage to the Finnish environment.

Statistics provide an excellent foundation for assessing the relative magnitude of environmental impacts. The drawback is that statistics, as Mark Twain noted, can be

manipulated to bend the truth. For example, Worldwatch Institute reports paint a view of the conditions in global environment quite contradictory to Bjorn Lomborg in his book *The Skeptical Environmentalist* /32/.

One approach to resolving these disparate views is to compare the figures used by both camps side by side. Although burdensome, an even better approach is to go back to the original source and make an informed assessment oneself.

Dredging as environmental destruction – mountain or molehill?

Most of us have some idea of what dredging involves. A large scoop or crab digs up the sea bottom, churning up loose sediment and making the water murky. If the bottom is sludgy, the water may smell bad.

Dredging activities are largely associated with the development and upkeep of maritime infrastructure. In the last decade, dredging activity in Finland has been subject to harsh regulation and an object of considerable press interest. Newspaper headlines exploit the popular notion that dredging is a filthy business and a major environmental problem involving hazardous chemicals in the dredging mass threatening marine ecosystems. Yet is this a fair portrayal of reality?

Dredging is basically underwater earthworks. A project to clarify the magnitude of dredging impacts entitled "The impacts and permitting process of harbor and channel projects" was commissioned by the Ministry of Transport and Communications, the Finnish Maritime Administration and major Finnish ports /10/. The general findings included:

- Dredging activity related to ports and channels serving Finland's foreign trade affects a tiny fraction of the sea bottom (annually no more than a few of square kilometers of the 53,000 km^2 of sea bottom in Finnish territory).
- Typically, the amount of suspended solids released into the water during dredging activity is 1–5 % depending on coarseness of the mass and the method used. Most suspended solids settle to the bottom near the dredging site.
- The amount of suspended solids released into the water during dumping is also about 1–5 % depending on mass coarseness and the method used. Again, most suspended solids settle to the bottom near the dumping site. A smaller amount is dispersed, but differences in turbidity or clarity in the water is usually imperceptible from the natural cloudiness of Baltic waters just a few hundred meters from the dumping site.
- There is no regional significance with regard to suspended solids from dredging activities. For example, in the Airisto Sea area in southwestern Finland (volume 4 km^3), dredging and dumping volumes are typically around 100,000 m^3 annually. Dredging and dumping increases the average level of suspended solids in the Airisto waters by about a tenth of a percent during the dredging period.
- Dredging spoils are typically dumped in bottom depressions to prevent the possibility of erosion.
- Dredging activity does not increase the amount of harmful substances in the sea, and disturbs annually perhaps one-hundred-thousandth of the legacy of harmful substances discharged by Finns into the sea.

- In theory, the upper limit for a harmful substance in sediment or the maximum acceptable risk (MAR) level should correspond to 5 % impact on the ecosystem. In other words, if a lake bottom is fully covered with sediment having an upper limit concentration of a harmful substance introduced by human activity, 95 % of the ecosystem is safe. In the sea, in fact, the impact would likely be smaller because of current action flushing the sediment surface.
- The lower limit value is supposed to correspond to a harmless level of chemical substance.
- The average content harmful substances in suspended solids stirred up by dredging activity in Finland is usually lower than in naturally occurring suspended solids in the water mass.

Figure 2.1 shows the impact magnitudes relevant to port and channel construction projects.

Finland's public discourse has extensively dealt with harmful substance levels in dredged sediments. Public attention typically focuses on outlier samples that reach or exceed maximum limit levels, even if they are not representative of the larger sample batch. The outlier figure is then compared against an unofficial guideline recommendation for the harmful substance.

Indeed, no matter what the human activity in the area, some harmful substance content of surface sediments will always exceed background levels. In certain spots, samples taken from the top few centimeters of surface sediment can show significantly higher values than in the sediment only slightly deeper. Moreover, limit values may ignore natural variations in substance content.

For example, the surface sediments in the waters near the town of Tornio at the top of the Gulf of Bothnia typically possess chromium levels in the range of 88–6,700 mg/kg of dry weight. While the area hosts Europe's largest chromium mine, most of the chromium found in the area is introduced by the Kemi and Tornio rivers as the result of natural erosion. In the guideline on dredging and dumping prepared by the Finnish Environment Institute /82/, the lower limit for chromium (guideline value) is 65 mg/kg and the upper limit value is 270 mg/kg of dry weight. Although the sea ecosystem in the sea near Tornio has bottom sediments with chromium content well in excess of allowed limits, no damage has been detected /81/.

Examining the dredging process more closely, we see that a layer about one-meter thick is scooped off the bottom, raised to the surface and deposited in a barge. The mass mixes so that differences in hazardous substance concentrations are equalized. The mass is then dumped back into the sea at the dumping site, further eliminating concentration differences. When the surface layers are removed from the dredging and dumping sites, a biologically active surface layer forms over the virgin dredging mass. The outcome is a nearly pristine bottom at both the dredging and dumping sites (Figure 2.2).

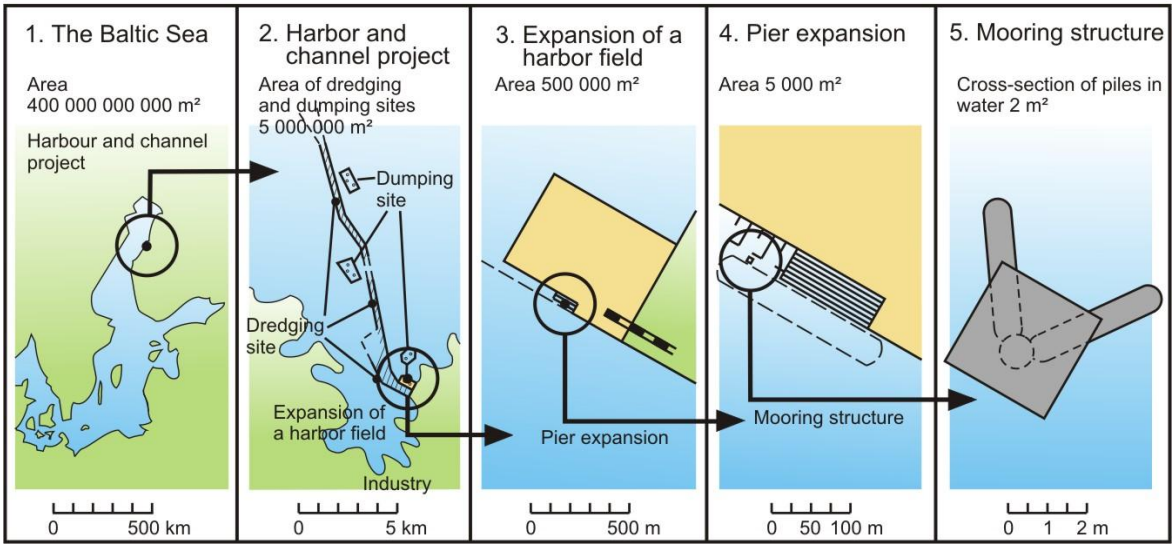
Size of Investment		**Mass quantity**	
Tiny	< 0,1 million euros	Tiny	<1 000 m³
Very small	0,1 - 1 million euros	Very small	1 000 - 10 000 m³
Small	1 - 10 million euros	Small	10 000 - 100 000 m³
Medium size	10 - 100 million euros	Medium size	100 000 - 1 000 000m³
Large	100 - 1000 million euros	Large	1 000 000 - 10 000 000 m³
Very large	> 1000 million euros	Very large	>10 000 000 m³

Fill or cut area in the bottom		**Duration of environmental impact**	
Tiny	< 0,1 hectares	Very short	< 1 day
Very small	0,1 - 1 hectares	Short	1 day - 1 month
Small	1 - 10 hectares	Medium	1 month - 1 year
Medium size	10 - 100 hectares	Quite long	1 year - 10 years
Large	100 - 1000 hectares	Long term	10 years - 100 years
Very large	>1000 hectares	Very long term	>100 years

Suspension, sedimentation	**Current speed**	**Erosion on dumping sites**
Not detectable	Very weak, < 0,2 m/s	Not detectable
In common range	Weak, 0,2 - 0,5 m/s	Within natural variation
10 x normal	Moderate, 0,5 - 1,0 m/s	Considerably larger than natural
100 x normal	Strong, 1,0 - 3,0 m/s	Significant part of mass will erode
1000 x normal	Very strong, over 3,0 m/s	Major portion of mass will erode

Average amount of harmful compounds in dredged and dumped mass
Minor (under the target value or the background level at the dumping site)
Within the background variation at the dumping site
Dirty (over the target value and background concentrations at the dumping site)
Polluted (over the limit value)
Heavily polluted (one order of magnitude over the limit value)
Very heavily polluted (two or more orders of magnitude over the limit value)

Character of the ecosystem
Insignificant (bottom or harbor area, dumping site, poor or spoiled bottom)
Ordinary
Notable (spawning area, wandering route of the fish)
Quite important (protection area)
Very important (key area for biodiversity or ecosystem)



Figures 2.1. Scales of magnitude considered in international harbor and channel construction projects /10/.

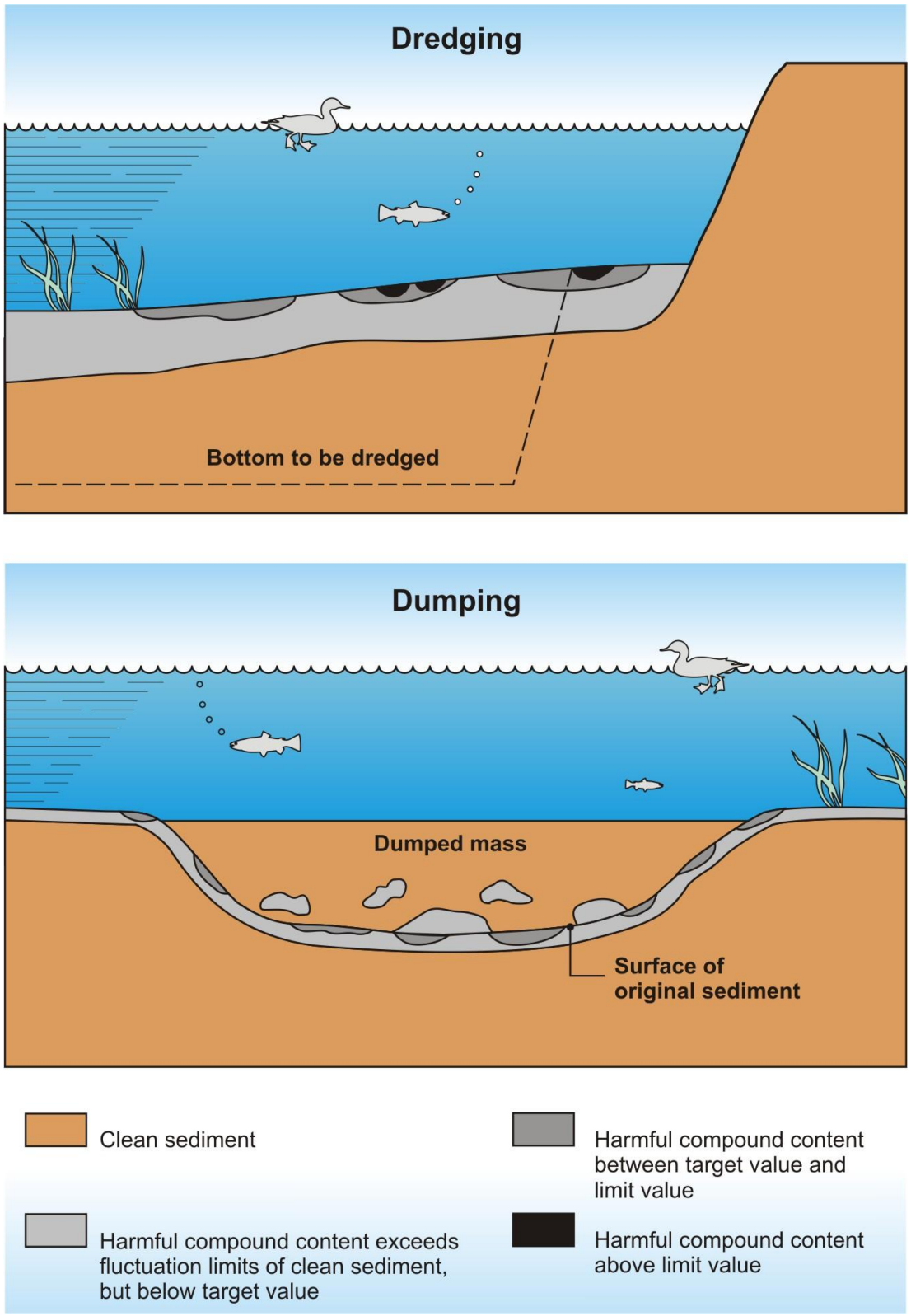


Figure 2.2. Impacts of dredging on the harmful substance content of the biologically active surface layer at the dredging site and the dumping site.

While dredging activity stirs up sediments, storm waves, sea currents, runoff and biological activity generate suspended solids at levels several orders of magnitude more efficiently.

Consider the Gulf of Finland. It has a water volume of about 1,000 km^3 and mean water depth of less than 40 m. The solid material content of water mass in the Gulf of Finland is typically on the order of 2 mg/l or more. Thus, there is about 2 million tons of solid material floating in the Gulf of Finland on any given day. If current velocity is 5 cm/s, the flux of solid material is typically 300 t/(km x day).

Now consider the effects of a powerful storm from the west in the Gulf of Finland. Significant wave height reaches 7.5 m at the mouth of the Gulf of Finland and 4.5 m at the eastern end of the Gulf of Finland. The loosest surface sediments start to erode throughout the Gulf of Finland. In the areas of breaking waves or loosest sediments, solid material content commonly exceeds 1,000 mg/l and may exceed 10,000 mg/l close to the bottom /6, 27, and 79 /.

Based of an order of magnitude estimate using /59, 71, and 78/ the storm easily adds 10 million tons of suspended solids in the water mass of the Gulf of Finland. The flux of solid material typically increases by more than an order of magnitude, and suspension is especially heavy close to the bottom.

The surface sediments in the Gulf of Finland are hardly virgin /30/. The concentrations of cadmium, mercury, TBT and certain other harmful substances commonly exceed the lower limit value used in Finland. However, the lower limit value used in Finland is often a fraction of the value used in other countries for the same substances /26/. In any case, the ecosystems has adjusted to this environment including the varying flux of suspended material, the dynamics of surface sediments and the heavy suspensions near the bottom during disturbed periods.

A one-million ton dredging and dumping project may temporarily add 200 tons of suspended solids into the water mass of Gulf of Finland. Since the content of harmful substances in dredged material tends to be lower or similar to that of the bottom and suspended material floating around, dredging in general poses little, if any, threat to marine life in the Baltic.

The most famous dredging case in Finland involved the construction of the Port of Vuosaari in eastern Helsinki. The project called for transferring cargo handling operations from the southern shore of downtown Helsinki to the remote Vuosaari area in the eastern part of the city. The goal was to get heavy road traffic out of the city center and convert the former harbor areas into residential housing districts. From the start, the project faced opposition from the environmental administration and the media. The permitting alone took over ten years.

During the final phase of the harbor permitting process, a small area with high TBT content was discovered. The site had earlier been directly below a floating repair dock often used to sandblast paint off of ship hulls.

The *Helsingin Sanomat* followed the case for three years. Initial articles remarked on the "sky-high" TBT levels of individual samples and labeled the person in charge of the harbor dredging an environmental criminal. This was followed by a series of articles dealing with

the possible impacts of TBT on the environment. Even the EU Commission and the EU Parliament got involved; initiatives were submitted by several environmentally active politicians. Considerable amounts of ink were devoted to publishing the views of concerned letter-writers and journalists.

There were even horror-story articles on TBT content in Vuosaari fish and the possible dangers to human health.

The Ministry of the Environment decided to issue strict unofficial limit values for TBT levels in sediments. Some of the more problematic outlier samples had TBT levels two orders of magnitude larger than the upper limit. In the end, the environmental administration required a massive dredging operation isolated by an extensive dredging curtain and entombment of the TBT-containing mass below the harbor field.

What would have happened if this exceptional dredging project had been implemented using traditional backhoe dredging and dumping of the dredging spoils at sea? This scenario is considered in Appendix 2. Given the years of controversy surrounding this particular dredging operation, the analysis offers some rather sobering findings:

- Dutch studies notes that a standard ocean freighter releases about 0.2 kg of tributyltin a day. Thousands of TBT-painted freighters visited Finnish harbors each year for decades, yet environmental problems from TBT were never detected. Addressing Finland's parliament, former environment minister Jan-Erik Enestam estimated that TBT emissions in Finnish waters were on the order of 20,000 kg a year in the 1970s and 1980s, and that such emissions had been halved by 2004 /9/.
- The Vuosaari dredging mass contained about 100 kg of TBT. In a standard dredging operation, about 10 kg of this would have been stirred up and mixed with seawater. That quantity corresponds to the emissions of a traditional ocean freighter over two months. In other words the suspended amount would have corresponded to the legal emissions of an ocean freighter legally anchored in Vuosaari for two months at the time of construction.
- Dredging does not add TBT to the sea. Nearly all TBT from the dredging would have been covered on the sea bottom at the dumping site, where it would have gradually broken down and vanished over time. The resulting bottom would have been cleaner at both the dredging and dumping sites.
- The organotin content in Vuosaari fish averages 20–50 μg/kg. The European Food Safety Authority (EFSA) estimates that a person can ingest an average of 0.25 micrograms of organotins a day per kilo of body weight without health risk. This limit contains a safety factor of one hundred /51/. Basically, a fairly slender woman could eat 400 grams of Vuosaari fish daily and the health risk would still be smaller than if she drank one glass of wine each month.

The bottom of the Baltic Sea certainly shows signs of human activity, but dredging or other operations generating marginal amounts of suspended solids are not problematic. Indeed, dredging typically yields a cleaner sea bottom. Working in tandem, the Finnish environmental administration and the Helsinki-based mass media have succeeded in making a mountain out of a molehill.

Shifts in natural wealth and diversity

While putting issues into perspective using familiar activities and statistics are helpful in environmental assessment, comparison between different types of environmental impact remains difficult. For example, it is from the above discussion to relate the waste water release from the Kaukas pulp mill to, say, a planned harvesting of timber, an oil spill, or the lifecycle effects of a landfill.

The matter can be approached by examining changes in natural wealth and biodiversity caused by environmental impacts. The relevant parameters here are the relative magnitude of the change, the scope of the area affected, and the duration of the impact.

Working definition: The environmental impact of a particular phenomenon, action or activity can be determined by multiplying the relative intensity, scope, and duration of the impact. Use of a weighting factor for the relative natural value of the impacted area makes comparison with impacts in other areas possible.

The advantage of this approach is that anybody can assess an environmental impact merely by making the required calculations. In many companies and administrative offices, decision-making on even complicated issues is routinely based on similar simple but understandable calculations.

One should note though, that nature in itself is a process of constant change, even if it seems an ecosystem at the local level is fairly stable over the medium term. Life evolves along with shifts in natural conditions and population dynamics. From this point of view the idea of environmental balance is an illusion /20/.

Since the last ice age ended over 10,000 years ago, the average yearly temperature in Finland has fluctuated over a range of several degrees Celsius. During that time, the geographic distribution range of the Common Hazel (*Corylus avellana*) has shifted north and south in Europe across a band over 1,000 km wide. Forest fires, storms and floods have had dramatic effects on local ecosystems over short periods. There have been years when mole populations exploded. Whenever change came, some species prospered at the expense of others.

Since multi-celled animal life became established over 600 million years ago, the geological record suggests that events such as major meteorite impacts, volcano eruptions and ice ages have managed to seriously affect or wipe out large swaths of surface life. Every time, even if it may have taken a few million years, natural wealth and biodiversity has reemerged.

Similarly, natural systems adjust to anthropogenic environmental effects. Small shifts are even difficult to judge as to whether the overall impact was positive or negative. On the other hand, large shifts as a rule lead to degradation of natural wealth and biodiversity in the short run.

Non-linear change is typical of most environmental impacts (Figure 2.3). A tiny change can weaken the living conditions for one species, while improving conditions for another.

Negative short-term effects increasingly dominate as the magnitude of the impact grows, because large changes overwhelm nature's ability to absorb shocks. The loss of a single species can topple an entire ecosystem. Gradually, however, nature reestablishes order in the context of new dynamic ecosystem.

The environmental impact of a given phenomenon, action or activity is difficult to estimate precisely. Ecosystems are sometimes evaluated by deconstructing them into components (mammals, fish, birds, insects, etc.). Natural wealth can be measured in terms of ecosystem biomass and diversity in number of species. To achieve comparability across ecosystems, a weighting factor can be applied to ecosystem components. For example, stocks of fish with high commercial value are distinguished from stocks of fish with low or no commercial value. The relative impact can be estimated by help of changes from the pre-impact situation (Figure 2.3).

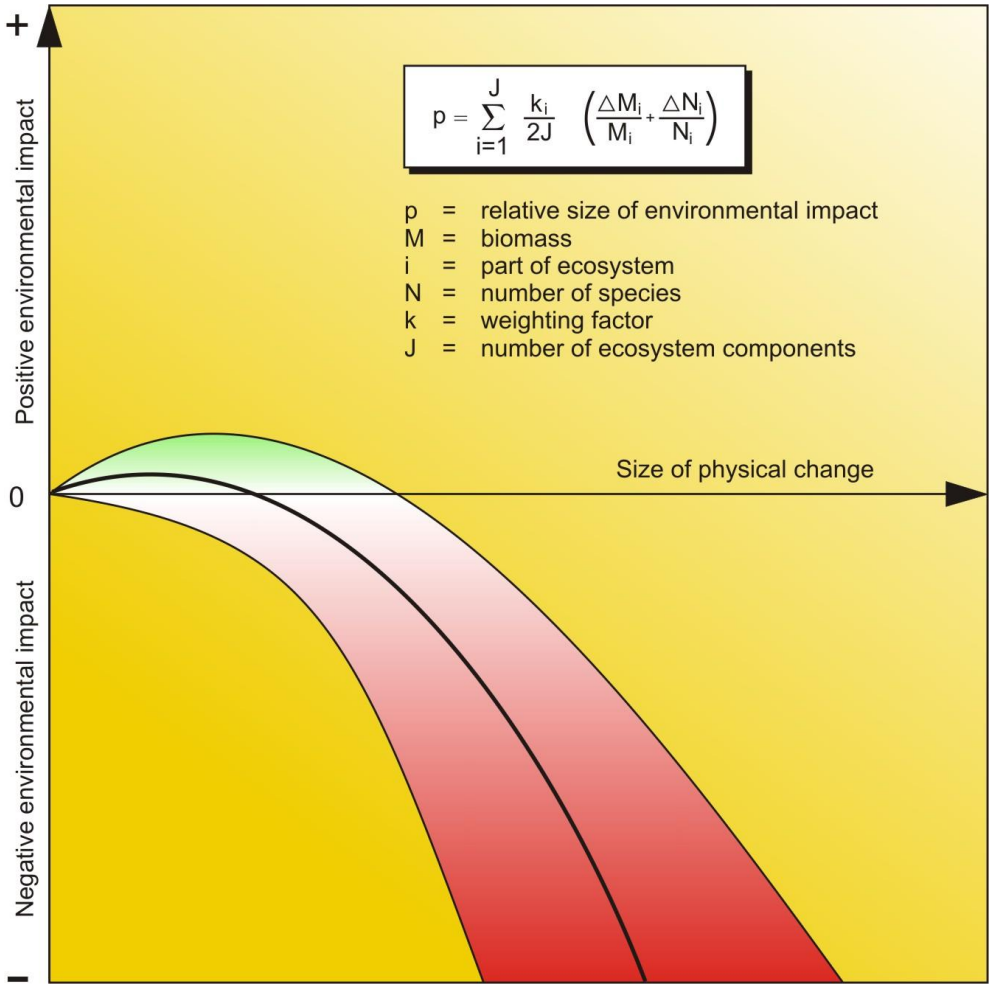


Figure 2.3. Dependency of environmental impact on magnitude of external changes.

The application of weighting factors is slightly problematic in practice as multiple valuations are involved. One needs to keep in mind the theoretical motives for applying weighting factors – the goal is not an exact figure but a rough estimate of the magnitude of the impact. As long as the nature of the impact is clear, one can make a usable assessment.

Figure 2.4 presents typical magnitude estimates of environmental impacts from various human modifications of the natural environment. Clearly, when a grove of trees is cut and replaced with a storage yard, the natural wealth of the area is diminished. Even so, some species can benefit from the change; for example, the warm updraft from the asphalt in the late afternoon draws insects into the airspace above the yard, creating feeding opportunities for swallows.

While natural diversity is generally impoverished by field-clearing and monoculture, the relative size of the impact is location-specific and depends on the site's original condition and the surrounding environment. If a largely forested area is opened up with a field, it could even increase biodiversity in the area.

City-building has typically been considered highly destructive of natural wealth and biodiversity. In contrast, in residential suburbs gardens and parks can largely compensate for the natural wealth and biodiversity lost through urban construction, parking lots and other infrastructure.

It is not always easy to anticipate the scope of impact of a given phenomenon, action, or activity. The strength of the impact varies across parts of the primary impact area, and may be reflected outside the primary impact area as various external factors interact.

A field, for example, influences the ecosystem of the surrounding forest and vice versa. Biodiversity is particularly rich in the transition zone. The distinguishing of how strongly particular areas are affected improves the accuracy of impact magnitude estimation.

The duration of impacts from various phenomena and actions vary greatly in nature. Nature has the ability to recover even from large environmental changes (e.g. revegetation after forest fires, breakdown or sedimentation of hazardous substances) and to adjust to changes in the ecosystem.

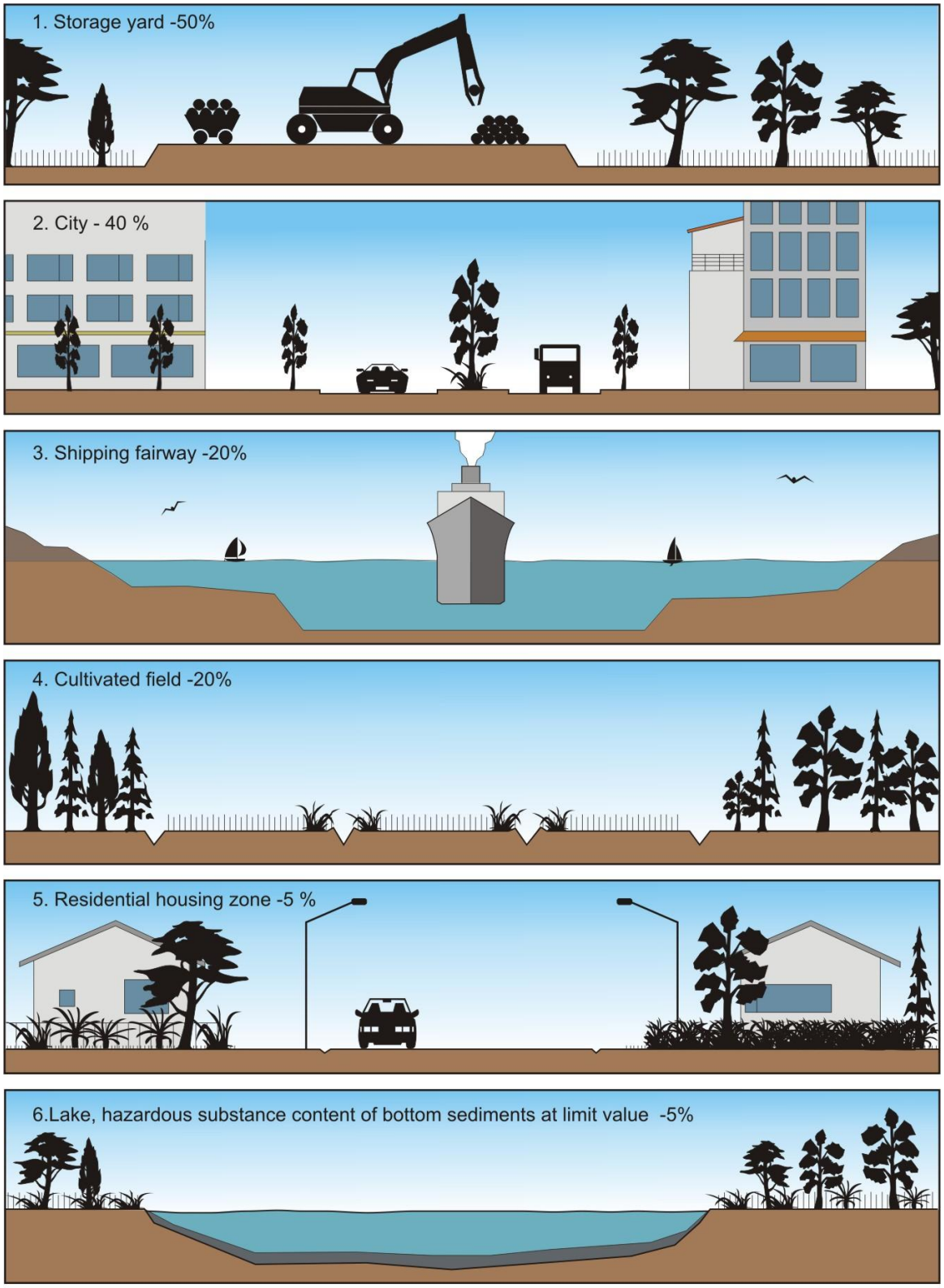


Figure 2.4. The relative intensity of impacts of human activity on various environments.

The time frames of various environmental impacts are described in Figure 2.5. In **Situation a)**, the environmental impact lasts essential as long as the physical event. This type of effect (e.g. noise and artificial lighting) is common at worksites. This category also includes small one-time emissions into water or the atmosphere.

Situation b) involves an immediate shock to the ecosystem and long recovery such as a large oil spill in Finland's southern archipelago. The direct impacts are the despoiling of shorelines and death of water birds. The impact on the local ecosystem may also be cumulative. It can also reflect to the coastal areas of the Arctic Ocean and the North Sea by reducing the number of migrating birds. Recovery of the immediate local ecosystem to its former state can take a long time.

Situation c) shows the life arc of a typical construction footprint. Site preparation and construction activity, for example, typically have larger environmental impacts than the much longer period when the structure or facility is in use. At the end of the facility's lifecycle, landscaping and other remedial measures can be applied to bring the site back to an environmental condition even better than originally.

Situation d) highlights cumulative environmental impacts that persist at a high level long after the physical cause of the impact is gone. The phenomena described here include the climate change and ozone layer depletion.

We do not necessarily ascribe the same value to all areas for their natural wealth and biodiversity. For example, the Amazon rain forest or the Ruissalo natural park area near Turku could be considered more important per surface area unit that land in the mid-Sahara or open sea in the mid-Atlantic. A weighting factor for a specific area allows for recognition of its ecological significance, including the presence of endangered species and links to larger ecosystems such as resting and feeding grounds for migrating geese or turtle breeding grounds.

If the weighting factor for a specific area is increased, the weighting factor for other areas should be decreased correspondingly. This allows for calculation of the relative natural significance of individual areas. The overall equivalent surface area, e.g. the Earth's surface, remains constant. When a weighting factor is applied, it naturally is based in accordance with the overall situation, and should not be applied capriciously.

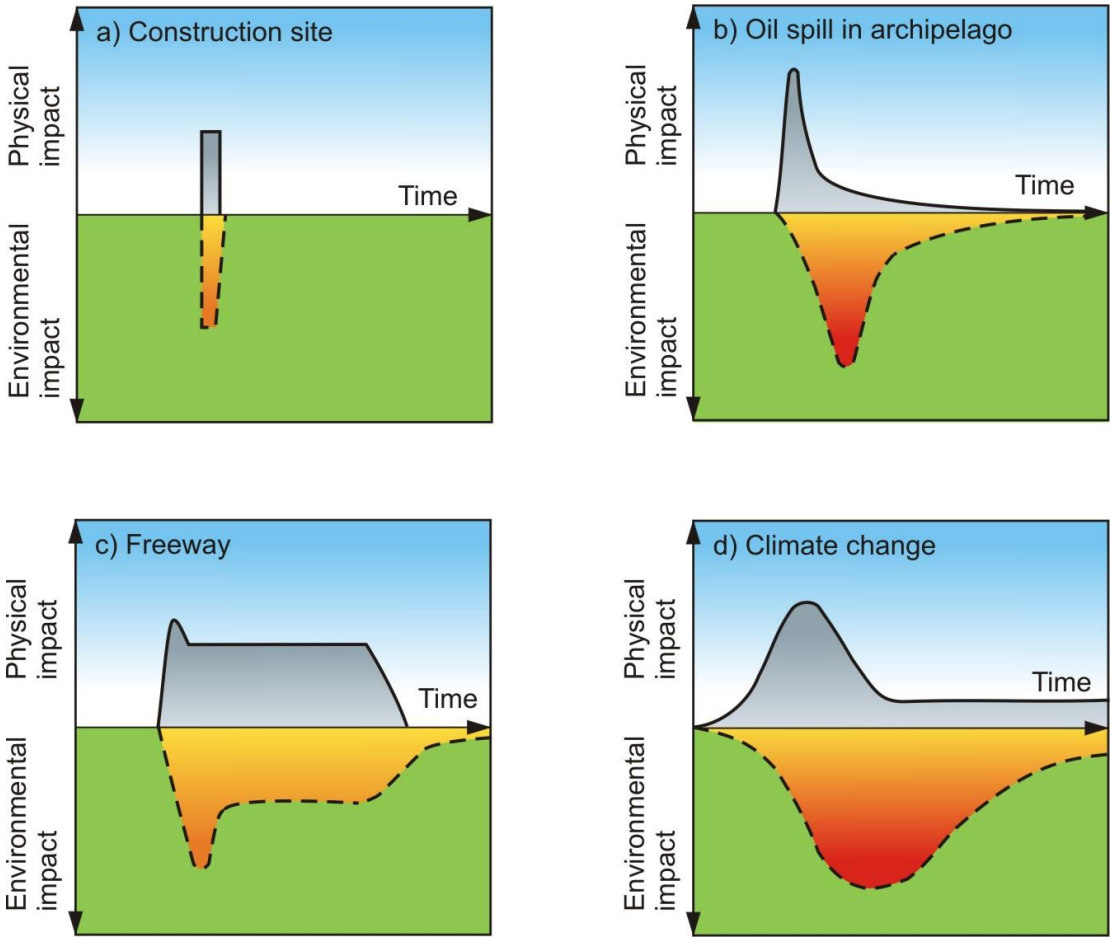


Figure 2.5. Attenuation of physical and environmental impacts in hypothetical situations.

Open-ended environmental impact scale

Equipped with the means for estimating environmental impact, we can now rank them by size. Figure 2.6 places environmental impacts from various phenomena, actions, and activities on a logarithmic (exponential) scale similar to the Richter scale of earthquake activity. When new impacts are ranked alongside familiar impacts, their relative significance becomes easy to assess.

Environmental impact is organized in ten- and thousand-fold increments on the scale. Thus, if the base level is one meter, then the thousand-fold increase would be one kilometer. A million-fold increase would be a million kilometers, or roughly the distance from the Earth to the Moon and back.

In the following examples, the approach is visualized for a dredging operation. Appendix 3 provides detailed explanations of how the values for the examples in the Figure 2.6 were calculated. The reader is encouraged to recalculate these reference points and other examples using independent information to get a feel for this proposed method and its accuracy.

Figure 2.6 shows the huge range of differences in the possible magnitudes of environmental impact. The impact of fossil fuel use is quite substantial, matched only by a major military conflict. Widely discussed activities such as landfills, in contrast, are shown to have relatively tiny impacts.

The UN's Intergovernmental Panel on Climate Change (IPCC) estimated that the average global temperature will increase between 1.4°C and 5.8°C in the next one hundred years if nothing in done to control greenhouse gas emissions. Besides higher temperatures, climate change is predicted to cause more violent hurricanes and storms, as well as shifts in precipitation patterns and amounts. Consequences of global warming include the melting of sea ice, permafrost layers and glaciers, a rise in sea level, and local changes in farming conditions. This is dealt with more extensively in reference /25/.

We use the IPCC scenario for a rise in the average global temperature of 3°C in our calculation (see Appendix 3). It is good to remember that the history of environmental science has been replete with theories and hypotheses that conveniently reinforced the prevailing social order or political regime. Despite widespread support for these views, they were eventually replaced with a new scientific paradigm /3/.

For example, less than 400 years ago, Galileo was put under house arrest for publishing his *Dialogue Concerning the Two Chief World Systems* because he ostensibly mocked the Catholic Church's case for the Aristotelian view that the Earth was the center of the universe. Today, few of us cling to a geocentric view of the universe, but it was once a controversy.

A number of respected scientists have challenged the assumptions underlying the IPCC scenarios. Some argue that the impact of carbon dioxide emissions on climate is negligible, while others claim the IPCC has been overly cautious and that the emerging risks to the global climate may be worse than projected. Researchers disagree as to whether the current temperature rise is human induced or not, and if there is a human contribution, how much. While we work forward based on the IPCC predictions we should remain open to all sides of this scientific discussion and even be willing to fund research that appears to be politically incorrect.

In many cases, human activity can have not only social and economic, but clear environmental benefits. Those should be included in an environmental impact assessment. Sample efficiency calculations connected to cutting greenhouse gas emissions are provided in Appendix 4.

The positive impacts of the proposed Vuotos reservoir and hydroelectric plants, for example, are estimated to be an order of magnitude greater than the negative environmental impacts noted in Figure 2.6. We now have an important question to make. What is the point of using the habitat directive to block this ecologically beneficial, economic and locally supported project when the environmental values that the directive is supposed to protect in Vuotos are destroyed anyway by uncontrolled global warming?

This calls into question the rationality of many European Union environmental policies from treating waste and marginally problematic soils with massive fuel-consuming operations to decade-long permitting processes in projects that cut greenhouse gas emissions.

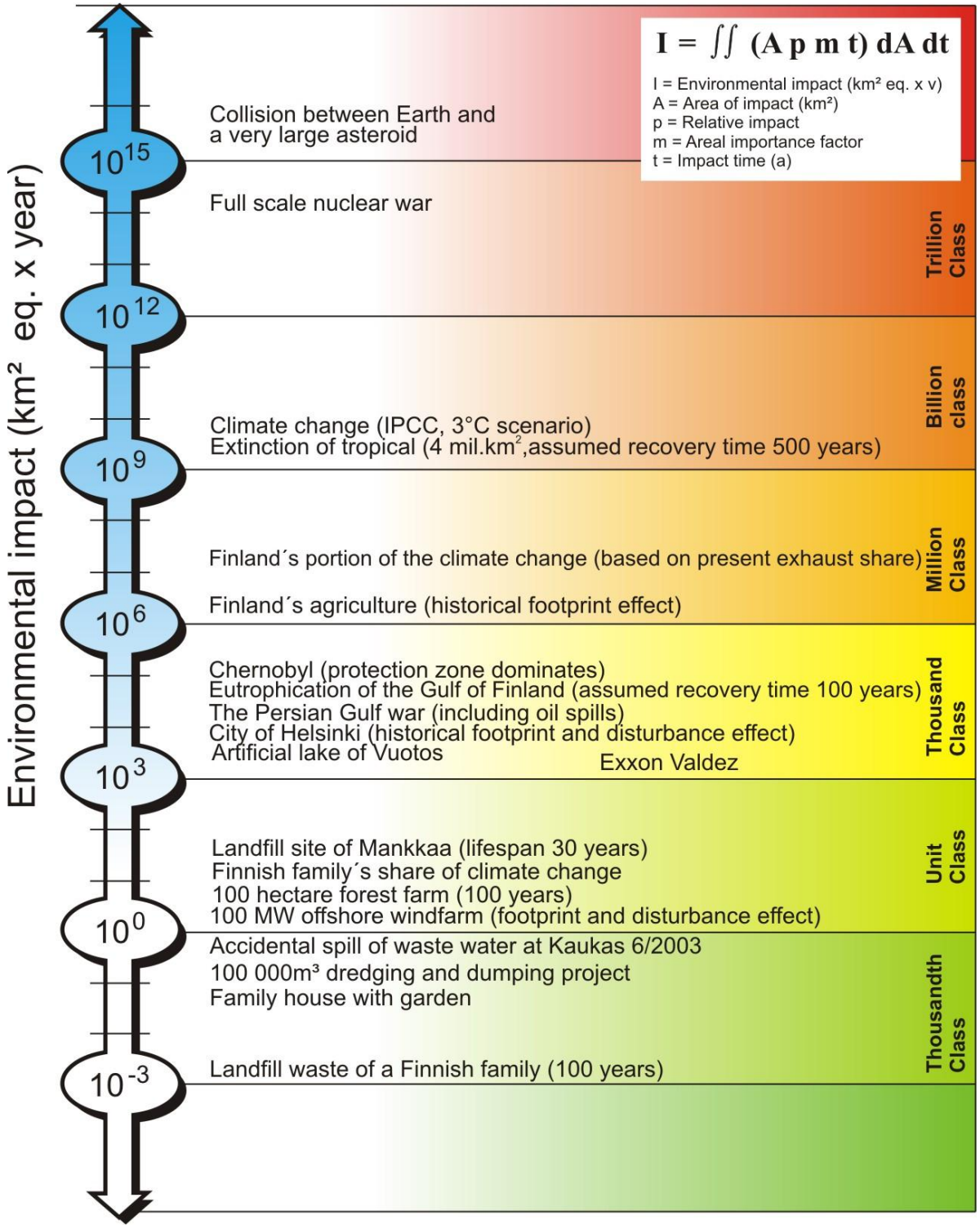


Figure 2.6. The open ended environmental impact scale showing the relative impact of various natural and man-made events and activities.

Case: 100,000 m^3 dredging and dumping project

Here, we consider a fairly large dredging and dumping project along the Finnish coast. Most of the 100,000 m^3 mass to be dredged is fine sediment. The average harmful substance content in the mass is less or similar to levels found in surface sediments at the dredging and dumping sites and in suspended solids in the area.

The project's footprint effect is assumed to cover the 6-hectare dredging site and a 10-hectare dumping site that takes into account dispersal of the dredged spoils in the water. The relative environmental impact at the dredging and dumping sites is initially assumed to be 25% (we have the water mass, sea bottom, and air to consider). The ecological weighting factor for the water area is assumed to be 1.5, used here for shallow waters. The ecological condition of the bottom is expected to recover linearly over two years (initial recovery is fast, but full recovery takes longer). The footprint effect from the dredging and dumping would be:

I = - (0.06 + 0.10) km^2 x 0.25 x 1.5 x 0.5 x 2 years = - 0.06 km^2 eq. x year

The added cloudiness and disturbance associated with the dredging and dumping operation is assumed to have an environmental impact extending over 15 hectares around the dredging site and 30 hectares around the dumping site. The relative environmental impact is conservatively assumed to be 30 %. This includes the effect of driving off fish, which simply increases their numbers elsewhere. The weighting factor is again 1.5 and the duration of the impact is essentially the same as the length of the dredging operation, i.e. three months.

The clouding and disturbance effect is:

I = - (0.15 + 0.30) km^2 x 0.3 x 1.5 x 0.25 years = - 0.05 km^2 eq. x year

The operation's local environmental impact value would thus be - 0.11 km^2 eq. x year. Harmful substances are a minor component in this case.

The environmental impacts of human activity

The annual environmental impacts from a company, public-sector organization, or even a domestic household's daily activities, can be described in terms of square-kilometer equivalent. This is easy to determine as long as the impacts are nearly linear. Problems arise, however, when considering cumulative impacts and non-linearities. The matter can be handled with similar simplifications as in the calculation of climate change impacts in Appendices 3 and 4.

Below is a case summary of the environmental impacts from operations at a fairly large port in southwestern Finland, including the effects of sea traffic in the harbor area. The harbor has been subjected to rigorous permitting processes and monitoring programs connected to its development and operational impacts. The environmental effects of harbors, sea traffic, and construction of harbor structures are detailed in a separate appendix of reference /10/.

Case: Square-kilometer equivalent comparison of annual environmental impacts of port operations and related sea traffic

Port activities

Carbon dioxide emissions from energy use	- 3.6 km² eq.
Harbor fields and channel areas, footprint effect	- 2.0 km² eq.
Dredging and dumping activities	- 0.1 km² eq.

General impacts of sea traffic and port activities

Water supply and management waste water from ships	- 0.2 km² eq.
Garbage services for ships	- 0.1 km² eq.

Environmental impacts from navigation in the harbor area

Carbon dioxide emissions	- 18 km² eq.
Nitrogen oxide and sulfur dioxide emissions	- 1.0 km² eq.
Tributyltin emissions from foreign ships (now eliminated by international treaty)	- 0.1 km² eq.
Other effects, total (risk of accident, erosion caused by sea traffic, etc.)	- 0.2 km² eq.

Scale of impact (see Table 2.1):

Comparison of environmental impacts of port activities with other common activities:

Harbor activities (1,500 employees)	- 0.004 km² eq./employee
Finnish commercial agriculture (50,000 employees)	- 0.1 km² eq./ employee
Finnish forest industry (50,000 employees)	- 0.25 km² eq./ employee

On the basis of this analysis, the best and most cost-effective way to reduce environmental impacts is to improve the efficiency of service for scheduled line vessels. If line vessels can balance traffic delays by more efficient cargo handling and service in port, fuel consumption will be reduced (a large ship uses 50% more fuel per nautical mile at full speed than at its optimum speed). Carbon dioxide emissions are reduced as well as sulfur and nitrogen oxide emissions.

Eco-balance

The term "eco-balance" is used here to compare a given area's current environmental wealth and biodiversity against the original situation before, say, industrialization or a population explosion.

It is usually quite easy to identify the main phenomena or actions affecting an ecosystem. The scope and intensity of the impact itself, as well as the scope and intensity of the change, can be estimated using the above described method. We take Finland as an example.

Finland is a sparsely populated and industrially sophisticated country with 5 million people. Population growth is minimal and even set to decline in coming years. Emissions of hazardous compounds have fallen significantly over recent decades. This is reflected in improvements in air and water quality.

Out of Finland's total land area of 337,000 km^2, some 170,000 km^2 is commercial forests and 20,000 km^2 cultivated fields. Populated areas account for about 6,000 km^2 and the national road network covers about 1,000 km^2.

Over 10 % of the land surface in Finland is protected under various programs. Restrictions and guidelines are designed to reduce the impact of human activity in protected areas. Zoning options are also limited.

Changes in the wealth and diversity of Finland's natural heritage have been fairly minor in the past century. Even as certain species have vanished from Finland, they have been replaced by new species. Some changes are the result of natural fluctuations in populations; some the result of changed conditions (e.g. development of new agricultural and forestry practices).

Table 2.1 provides the estimated eco-balance and its rate of change for Finland. Weighting factors for particular areas have not been included. This estimate indicates that the eco-balance in most areas is close to the original. At present, the overall direction of change is positive.

It is possible to make several conclusions from these calculations. Forestry, agriculture, and other human activities are largely responsible for the legacy of fractured ecosystems and somewhat degraded water supplies. On the other hand, these activities have been the basis for the social and economic development of Finland. The situation has largely stabilized.

Construction of new city areas, along with the building of roads and highways, while often central to environmental disputes, exert only a minor impact on eco-balance. Often these changes are zero-sum. As eco-balance deteriorates in an expanding urban area, it improves elsewhere through depopulation of rural areas and the abandonment of farmland.

Harmful substances central to the public debate (heavy metals, TBT, PCBs, etc.) are estimated to have minor impacts on eco-balance. The largest problems by far are caused by phosphorus and nitrogen compounds used in fertilizers getting into water systems and sulfur and nitrogen compounds released into the atmosphere.

Emissions resulting from industrial accidents in the process industry have received extensive press. Yet, the small oil spills at the Naantali oil refinery and the waste water releases from the Kaukas pulp mill are miniscule in comparison to the amount of emissions released under permit. The widely published emergencies and conflicts, therefore, seem to be more issues of minor nuisance and quality of process management than ecology.

Climate change has begun to manifest itself as a rise in Finland's average annual temperature. For the past 15 years, winters have tended to be mild and fairly short. The number of bird species seen in Finland tends to increase in warm years. Warmer weather promotes eutrophication effects in water bodies.

Although the strengthening of the greenhouse effect does not appear in the national eco-balance, it has the potential to disrupt Finland's eco-balance far more than Finland's entire legacy of human activity. The conifer forests of Southern Finland could well disappear, higher sea level would reduce Finland's surface area, and the wetlands of the Bay of Liminka (a Mecca for birdwatchers), would vanish. Changes in precipitation would induce profound changes in natural hydrological systems.

The environmental problems in some other countries differ in type and scale from those in Finland. The calculation of eco-balances elsewhere in the world would add some perspective here.

The environmental problems facing certain populations in Africa are discussed for example in reference /18/. Exploding populations may force people to seek sustenance in new areas, so more trees are felled and burned. Land is cultivated for a few years until it is no longer fertile. Livestock grazing removes the remaining plant life and the land is left barren. Erosion from wind and rain causes desertification. The richness and diversity of nature is lost from a wide area and some species are threatened with extinction. In the end, the collapsing carrying capacity of the land and the booming human population collide with tragic consequences.

In many industrializing and industrialized countries, environmental pollution has reached the point where its affects both the natural world and human life. The depletion of fresh water supplies has led to severe shortages of irrigation water across vast areas /70/. Aggressive commercial fishing practice has caused the collapse of fish stocks. Constraints on local living conditions, such as poor access to fresh water, have led to military conflicts and the breakup of societies. In extreme cases the result has been a vicious downward spiral of social, economic and environmental hardship.

Eco-balance calculations help in identifying the most cost-effective approaches to remediation of the environment. In the case of the Finnish environment, elimination of sulfur in fuels used in Baltic Sea traffic and investment in more waste-water treatment facilities for the City of St. Petersburg are excellent remedies. Changes in the structure of energy production would also help fight climate change as long as it is part of coordinated international efforts.

Getting results in developing countries may require different methods such as greater investment in education and birth control /56/.

Factors	VALUE CALCULATION	ECO-BALANCE	COMMENTS	RATE OF CHANGE	COMMENTS
Footprint effects					
- Forestry	100 000 km² x 0% - 100 000 km² x 5%	- 5000km²	If a half of forests are cultivated and the other half are old, the impact is ~0	+50 km²/v	• Methods of forestry are getting better. • Increase in wood volume • Forests are being protected
- Farming	10 000 km² x 0% - 10 000km² x 20%	- 2000 km²	Richness of nature and biodiversity decreases only in areas, where farming dominates	+ 20 km²/v	• Spatial programs increase richness of nature and biodiversity
- Roads and channels	-126 000 km x 0,012 km x 50% 0,3 (16 000 km x 0,1 km x 20%)	~ - 850 km²		± 0	
- Cities and villages	6000 km² x 20%	~ - 1200 km²	In cities the impact is big, in suburbs the impact is small	- 10 km²/v	• Suburbs are growing
- Others (industrial and ware-house areas, land fills etc.)	2000 km² x 20%	~ - 400 km²		± 0	• New areas have been developed, but environmental standard´s have improved
- Human disturbance effects (modern part), shattering, accidents and catastrophes	- 307 000km² x 1% - 85 000 km² x 1%	~ - 4000 km²		± 0	
Impact of harmful compounds in nature (heavy metals, poisonous compounds etc.)					
- Land environment	-20 km² x 5% -0,3 x 305 000 km² x 0,1%	- 100 km²	It is difficult to estimate the stress effects	+ 2 km²/v	•Emissions have decreased significantly harmful compounds in nature get covered and disintegrate
- Water environment	-200 km² x 2% -0,1 x 53 000 km² x 0,2% -0,2 x 32 000 x 0,1%	- 200 km²	It is extremely difficult to estimate the stress effects	+ 8 km²/v	•Emissions have decreased significantly harmful compounds in nature get covered and disintegrate
Eutrophication					
- Land environment	+ 0,5 x 305 000 km² x 10%	+ 10 000 km²	At least biomass has increased	+ 200 km²/v	• The amount of nitrogen is getting smaller
- Water environment	-0,2 x 32 000 x 10% - 0,2 x 53 000 x 10%	- 2 000 km²	Powerful eutrophication and loss of oxygen reduce biodiversity	± 0 km²/v	• Eutrophication of the gulf of Finland increases, quality of inland waters is getting better
Acidification					
- Land environment	-0,1 x 305 000 km² x 2%	~ - 1500 km²	A difficult and unaccurate estimation	+10 km²/v	• Acid precipitation has reduced
- Water environment	-0,2 x 32 000 km² x 5%	~ - 300 km²		+10 km²/v	• Water quality in lakes, rivers and seas iss improving. Acid precipitation has reduced.
The greenhouse effect		+ 0	The rising of average temperature may have enriched Finland´s nature for some time	± 0	• It is difficult to estimate whether the sum of current effects is positive or negative
Ozone layer depletion		± 0	Apparent impacts can not be observed in nature	± 0	• The ozone layer is getting currently thinner, but current Impacts can not be quantified
		- 6000 km² (-1,5 %)		+ 300 km/v (+0,08 %/v)	

Table 2.1. A calculation estimating Finnish eco-balances and rates of change.

Dealing with risk and threats

Even the best-available technology can malfunction. It is important to analyze worst-case situations and study outlier scenarios and note their potential environmental impact. Such analysis is a standard part of any robust risk management scheme. The quantity of environmental risk is probability of occurrence multiplied by materialized environmental impact estimate.

Preparation of magnitude estimates for known environmental risks is straight-forward. For example, the amount and flows of tanker traffic in the Gulf of Finland can be simulated, so the probability of various types of tanker accidents can be determined. This approach can also be used in calculating types of environmental damage, their magnitude, probabilities and the possibilities of preventing them. Such analysis is useful in effectively allocating resources to prevention and risk-fighting measures.

Environmental risks for most traditional industries, i.e. the day-to-day and cumulative risks of most heavy industries are already quite explicit. This is probably also true for the environmental risks associated with production of nuclear energy in Finland. Experts say that recent design and technical improvements preclude the possibility of a run-away situation at a Finnish nuclear reactor causing anything close to the damage of the Chernobyl accident.

We also have centuries of experience in the use of tar. No significant problems have emerged from this legacy. Thus, the European Union's recent campaign to ban the use of tar seems a bit far fetched.

In contrast, the risks associates with new processes or innovations are often underestimated or even unimagined /13/. For example, the depletion of the ozone layer by CFC compounds came as a complete surprise to regulators and CFC users alike. Fortunately, the problem was understood and appropriate measures were taken in time.

An accident in a frontier industry in biotechnology or biochemistry could well carry ghoulish risks. At the same time, we should keep in mind that horror stories appealing to our basic fears resonate well with the media. They are endlessly repeated even as serious experts note the stories groundless.

We can try to deal with new risks by classifying new branches of technology according to their risks, and then applying appropriate limitations and safety measures to their development. The problem is non-trivial as they often require rethinking of traditional values such as scientific independence and unfettered competition – not to mention possible ethical issues.

There is still considerable uncertainty surrounding the extent and rate of global climate change. Scientists participating in the IPCC studies, however, have concluded that their ball-park predictions have a fairly high degree of reliability. Moreover, the potential for environmental destruction is huge and may manifest itself in surprising ways such as a weakening of the Gulf Stream.

Thus, we need to be rational and take preventive measures to reduce risks and continue to modify our behavior as new information from the IPCC and other independent and critical

sources comes in. If we wait for scientific certainty, the cost of dealing with the realized environmental risk will already be too high.

Perhaps the largest environmental risks are associated with development of human society and the accompanied social processes. Although it has been just six decades from World War II, we Western Europeans have become accustomed to peaceful existence and high standard of living. Our lives are just now so comfortable that many of us do not consider such risks.

The population explosion, combined with the decline in regional living conditions, carries the seeds of military conflict. Risk is further enhanced when terrorism and fanaticism are added to the mix. Broad economic collapse in Europe could lead to reckless behavior. Europe is not isolated from the risks of military conflicts that involve also extensive environmental destruction.

Chain-reaction scenarios suggest some of the most dreadful images of environmental destruction. The combination of Western dependence on fossil fuels, climate change, and the spread of weapons of mass destruction, is quite explosive in international politics. If farming conditions in our planet's bread-basket regions are impaired by climate change, nuclear threats become more realistic and terrorism starts to find a wider audience. The risk of a major military conflict grows. Global warming could be followed by a nuclear winter.

A rapid reduction in our reliance on fossil fuels would help in managing such risks.

Use and limits of presented method

The above discussion considered a method for assessing the impact of a given phenomenon, action, or activity on natural wealth and biodiversity. While imprecise, the method makes it easy to assess the magnitude of an environmental impact in terms of a spatial equivalent (e.g. square kilometers) over time (e.g. years).

Ideally, estimates of environmental impact would involve the use of several analysts versed in evaluating the magnitude of environmental impact in combination with at least two independent experts in the type of environmental impact involved. Consideration of the nature of the problem and its various dimensions would be performed first, and then the magnitude calculation was made.

Practicality dictates that those making calculations independently establish a basic framework that includes familiar reference points that can be related to derived values. In this way, no aspect of an impact is unnecessarily exaggerated.

The method is not well-suited to all types of impacts considered environmental including:

- landscape impacts;
- impacts on cultural heritage;
- impacts on recreational use of an area;
- odors, noise, or other nuisances that interfere with the use and enjoyment of land;
- impacts on human health;

These matters are largely covered by existing legislation. Several public agencies are charged with monitoring and administering them.

There is also the issue of endangered species, which the method can treat only by a weighting factor. Here we should bear in mind that while human activities may cause extinction of some species, evolution is also a natural process.

Establishing protected areas does not necessarily assure the well being of threatened species or habitats. Many species are given added protection by naming them endangered and providing them extra protection at the expense of human activities. This naturally skews natural competition by granting special status to threatened species and habitats over other species and places.

It would be quite valuable if legislation and standards could make the distinction as to whether a species is threatened globally (e.g. all tigers) or if it is threatened in an area at the edge of its traditional domain (e.g. flying squirrel in Finland). Species living at the edge of their traditional range may often appear and vanish for entirely natural reasons. One could also reconsider the need of protecting isolated populations of common species.

There is also a need to identify species declared threatened by politically guided administrative decision without a proper scientific basis (e.g. the sea beetle *Macroplea pubipennis* in Finland). Finally, separate treatment should be given to occurrences of non-resident species (e.g. harbor porpoise, North American mink), and highly destructive pests society would prefer to eliminate altogether (e.g. pine sawfly, smallpox).

Our planet is home to an estimated 1.6 million species of vertebrates, mollusks, crustaceans, insects and vascular plants /32/. The total number of species is estimated to range from 5 to 15 million in /35/.We have only the slightest notion of how many kinds of micro-organisms might exist.

The depletion of resources is another factor that the method does not take into account. For example, the Earth's most accessible oil and gas deposits are likely to be depleted in this century. Of course, this does not mean that our planet will run out of energy sources. Exploiting other energy sources will require further technological advances to make them more economically accessible.

We should also make ourselves be aware of the various measures of environmental impact that have been developed. A range of ecological, economic and social indicators suggested for quantifying sustainable development are described in references /8/ and /43/.

While there are no perfect measures of environmental impact, there is a tendency to choose methods and pick up results to support a desired conclusion. Thus, one should always consider the basis and then ask honestly what the result is telling about the real world.

Human emotions and interests play a huge role in the prioritization of environmental issues. This can be seen in legislation, in the actions of public officials, in the media and even in judicial rulings. Indeed, no approach including this one can claim to be fully objective. Impact assessments are often inaccurate and leave room for interpretation. Feelings and bias can also influence expert assessments. This is the topic we consider next.

3. THE CLOUDING OF COMMON SENSE

Nobel economics laureate George Ackerlof, among others, has observed that human behavior is not fully rational. (see for example /1/). Unfortunately, our hard-wired mental blind-spots often defeat our best interests. Thus, a powerful image linked with a personal desire or prejudice often confuses the frame of reference, placing us in a position where we may be unwilling to consider strong evidence contradicting our view.

Groups in society constantly seek to shape our opinions by playing on our beliefs or the predictability of our reactions. Vance Packard argued in the marketing classic *The Hidden Persuaders* that this ability to influence can be very effective /40/. Off course, the methods have developed further in half a century. If politicians and their surrogates, for example, repeat a political talking point in the media long enough, many come to accept it as fact. All that has actually happened is acceptance of ideological dogma.

The predictability of emotional reactions can also be useful in governing the scope and content of the popular discourse to make people more governable. Here, we consider examples of how certain groups in Finland have exploited – and even manufactured – environmental issues to achieve their own ends. In particular, we consider how Finland's mainstream media, politicians, bureaucrats, researchers, and the environmental groups have succumbed to sensationalism and emotional manipulation to advance their purposes. At the end of the chapter, we consider the role of illusion in shackling thought.

Delusive appeals to emotion

The Finnish press has devoted extensive coverage to birds colliding with the blades of wind turbines and the glass façade of Helsinki's new 12-story Sanomatalo building, which houses the editorial departments of the *Helsingin Sanomat* and other publications of Sanoma Oy, the nation's leading publisher. Dead birds sell papers.

Of course, it takes but modest effort to establish that the number of birds (residents, offsprings and migratory visitors) in Finland in any given year easily exceeds 100 million. In the course of the year, at least 10 million of these birds will succumb to disease, starvation, predators, or other natural causes. Traffic and housecats alone slaughter several million birds, while hunters take down another million. Even a single large pane of glass in a home may cause the deaths of several birds annually.

Studies of bird collisions with the wind turbines suggest that most birds recognize the danger of the spinning blade and fly around it. The number of birds lost to an individual wind turbine has been estimated to be in the range of 0.1 – 10 birds per year /28/.

Researchers at Finland's Museum of Natural History further estimate that the number of birds killed by flying into the side of the Sanomatalo building is about 100 a year. In other words, the issue here is more the heart-wrenching tragedy of witnessed bird deaths than a serious environmental problem.

Nevertheless, the image of a windmill slicing up flocks of migrating birds is powerful on a gut level. Such suffering at an understandable scale arouses our compassion, and makes us want to blame the windmill. People with widely disparate views otherwise suddenly unite on

the notion of this image. Summer-house owners disturbed by the wind turbine on their landscape simply use this image to bolster their case against local wind power development. Nuclear power promoters add this image to their list of arguments that includes the cost of wind power as compared to nuclear power. Environmental bureaucrats cite this argument in their desire to control development. The image of sliced birds can be used to support a range of positions.

Moreover, strong emotional images are commercially advantageous for the media, and far easier for attracting audience than providing objective analysis (which also requires reporters knowledgeable with the subject they are covering).

The Sanomatalo case reflects also another strong emotional reaction. Many people, including members of competing press, feel strongly about Sanomat Oy's dominant role in the Finnish media. Sanomat Oy was allowed to erect its new building just a stone's throw from the front steps of the Finnish parliament building. Perhaps the extensive coverage of the bird death issue with demands to tear the building down merely reflected aggression people held against this powerful media conglomerate.

Another kind of environmental sensationalism is found in coverage of a golf course projects in the Helsinki region. In Finland, most golf courses are repurposed farmland. How much environmental change is actually involved when fields, grazing paddocks and cultivated forest are converted into a golf course with greens, fairways, water hazards, groves of trees and other natural rough? Surely there is some change, but can we even say if this change is positive or negative? Certainly, a farmer makes far larger environmental changes when he clears and plows a new field or cuts old-growth forest, but such actions almost never make the news.

Indeed, the golf course issue is not so much about environmental degradation as zoning and land use disputes, a traditional arena for friction. Opponents to new golf courses might include birdwatchers or people, who take their dogs for romps in the forest. These groups feel they are losing a right to future recreation at the golf course area. Personal interpretations of environmental legislation are offered as the legal basis for resisting the golf course project.

The media also likes to focus on golf course opposition as it provides a David-and-Goliath narrative. Golf, after all, is still commonly thought to be an elitist activity. The rights of the property owner take a back seat.

Golf's environmental impact was raised in a letter to the evening paper *Ilta-Sanomat* in autumn 2004. A writer, who cited international numbers of an environmental group, claimed among other things that golf courses consume vast amounts of fertilizers and pesticides. A representative of the Finnish Golf Association responded with figures that showed that fertilizer and pesticide use at golf courses was just a tiny fraction of the amounts used in intensive agriculture such as strawberry farming. A Finnish MP (and former member of the European parliament) participated in the discussion by demanding that golf courses should be included into the national water quality protection program, as well as to the action plan of the national Baltic Sea program in order to save the Baltic Sea!

The study by the Finnish Golf Association showed that in total about 1,000 tons of fertilizer are used each year on Finland's golf courses, or about a half of a percent of total fertilizer use

nationally (about 200,000 tons). About 0.5 tons of pesticides are applied annually to golf courses, compared to Finland's total pesticide use of 1,000–2,000 tons a year /67/.

A political opportunist exploits aggression by playing off people's natural animosities toward a sport with an elitist image, while building a profile as defender of the Baltic Sea. She is ready to commit public resources to question the hobby of 100,000 people and a thousand jobs with an essentially non-existent problem. She is not actually interested in the Baltic Sea loading factors, as she is not pushing for an across-the-board reduction in pesticides and fertilizers that would hurt farmers and family garden owners in her own party.

The media's role in framing discussion

Few of us have the mental agility of the economist John Maynard Keynes, who when criticized by a journalist for changing a position, dryly replied, "When the facts change, I change my mind. What do you do, sir?"

Media organizations, which compete for people's attention, understand the need to cling to a set of beliefs. As a result news that affirms beliefs and arouses strong feelings is the basis of what has been described as "infotainment." Unfortunately, this exploitation often calls on the audience to direct their aggressions at people, organizations or activities. Obviously, distortion of relative significance detracts from the serious value of the news, but it also appeals to our prurient sensibilities.

One reason news media have been bent towards sensationalism and issue-manufacturing is their loss of their traditional news aggregator role. Instead of wading through the pages of a newspaper or waiting for the television newsreader to possibly get to items of interest, readers can now go online for news. This has put traditional news suppliers in the uncomfortable position of finding ways to staunch declining circulation numbers. They can cut back on staff, invest in new media and figure out how to make money online, or figure out ways to pump up reader or viewer interest.

The problem is that the search for economic short-cuts can hurt the media's overall contribution to democratic society – securing free flows of accurate information to the public. Nor is the change in the media entirely their own fault. Citizens themselves have a duty to challenge the media operators when they engage in sensationalism, promote trivial stories or overlook serious issues. Notably, citizens need to call out editors and publishers when they engage in:

- Information filtering for reasons other than community sensibilities (e.g. keeping pornography off the evening news);
- Amplification of minor matters or diminishing of major matters to distort their relative significance;
- Allowing the hijacking of discussions and allowing interest groups to frame larger public discourse; and
- Lemming behavior on the part of the press, which not only creates a national obsession with certain stories, but also sets up a massive news vacuum whereby nothing else happening gets covered.

The combination of select slivers of information, armchair expertise, and our society's living mythology provide the potent ingredients for sensational stories. And they reinforce public trust in the media provider.

The coverage of them Vuosaari TBT levels by the *Helsingin Sanomat* recycled the following tidbits of information in the "fact corner" in its series of articles on the harbor dredging project:

- The TBT problem in the Vuosaari harbor was identified in May 2003;
- The Uusimaa regional environment center halted dredging as soon as TBT was discovered;
- TBT had originated from ship hull paints that had been flushed to the sea from the Vuosaari dry docks;
- TBT harms the reproductive abilities of organisms living in seabed; and
- The use of paints containing TBT is now forbidden.

The first fragment of information introduces the questionable premise of all subsequent stories, i.e. that the presence of TBT in the amounts detected in the sediments in the Vuosaari harbor area constituted an actual problem. Interestingly, there was no discussion of the amount of danger by journalists, simply a focus on the unknown threat and the fireworks surrounding the permitting process.

In fact, the *Helsingin Sanomat* editors were well aware of the magnitude of the Vuosaari TBT issue (Chapter 2 and Appendix 2). It just seemed there was no room left for factual analysis that would have only detracted from the dramatic narrative and damage the credibility of the paper championing free speech. Information critical to the reader in making an informed assessment was systematically withheld after the paper had chosen its editorial line.

Guest writers are regularly invited to pen columns for the editorial page of the *Helsingin Sanomat*. In 2003, the paper carried 52 such contributions on environmental issues. Of these, 39 were written by public bureaucrats or researchers at state institutes, six by international operatives and four by environmental activists. Only three articles were contributed by experts working in the private sector.

Most guest columns are well written and of general interest. They also help to make the paper's opinion appear politically correct. The result, unfortunately, is that public administrators and the environmental movement dominate the discussion.

The information offered by the media is thus selected, shaped, and amplified to conform to a certain narrative. Sometimes issues are blown completely out of proportion to appeal to subconscious fears and desires of the readership.

Sustainable development – the degradation of a noble goal

A central tenet of the environmental administration and the environmental movement is that industrial countries now consume natural resources beyond the world's natural carrying capacity. Thus, if consumption in developing countries rises to the level of industrialized countries and the world population reaches 10 billion, consumption would increase to a level

eight times higher than at present. What happens when a billion Chinese and a billion Indians demand their right to consume at levels similar to Western consumers?

The quasi-official Finnish Environment Institute Statistics contends Finns per capita are among the most active consumers of natural resources in the world. The flows of natural resources, including imports and hidden flows, total about 500 million tons a year, or about 100 tons per inhabitant.

It is a chilling notion for Finns that we are consuming the wealth of future generations, and our inability to correct the situation makes us feel guilty. But have Finns actually exceeded the country's natural carrying capacity?

Closer examination of the resource consumption figure/34/ reveals that about 90% of natural resource "consumption" in Finland involves moving rock and earth from point A to point B (i.e. earthworks, mining, ore concentration, and erosion caused by human activity) as well as forestry and agriculture activity. Most of the remaining 10% involves energy products (oil, coal, and peat), chemical products, and metal products. In fact, Finland's natural resource consumption has been fairly stable over the past 30 years, with the exception of mineral use, which has grown strongly as Finland's heavy industry has shouldered its share of the international division of production.

It is difficult to see how transport of a marginal amounts of dirt and rock from place to place conflicts with sustainable development. Further, forestry and agriculture are not activities that inherently conflict with sustainable development.

The remaining resources consumed are energy, chemicals, and metals. As we well understand, fossil fuel reserves are limited. This applies especially to accessible oil and gas reserves, which presently appear sufficient for another century only. Other critical raw materials (iron, limestone, copper, aluminum, nitrogen, phosphorous, etc.) appear to be sufficiently abundant from traditional sources to last at least a thousand years /32/. Energy, of course, is plentiful; the challenge is in shifting to appropriate production technologies and bringing down costs of alternative energy supplies.

Thrifty attitudes, recycling, and moderate consumption patterns are virtuous behaviors. The environmental administration and the environmental movement, however, have three weaknesses in the natural resource argumentation:

1) We are not responsible for the population explosion in the developing world and the resulting environmental destruction;
2) There will be no shortage of raw materials or energy in the foreseeable future;
3) Matter is rarely lost or created. Its elemental forms can be simply recombined over and over again. For example, the water of the river Rhein is said to be used seven times before it reaches the sea.

In other words, the environmental administration and the environmental movement are using a manipulative message to make people feel guilty about matters of little substance.

We can also see the same psychological phenomenon in Finnish attitudes toward waste management. The image of a mountain of trash is repulsive. Opposition to the establishment and operation of landfills, which is based initially on odor and hygiene, is enhanced by

making people feel guilty about the problem, especially city-dwellers. Recent figures suggest that Finland generates over 100 million tons of waste annually.

Closer inspection, however, reveals that over half of Finland's "waste" is soil and rock. Like most societies, Finns earlier never considered soil or rock as waste. The new EU waste definition, however, treats soil and rock as waste in many instances. Of the remaining "waste", over 30% (mostly materials classed as waste products in farming activity and industrial operations) are put to a new purpose or burned for energy. Traditional household and urban commercial waste amounts to less than 10 million tons, including over a million tons of biowaste. About half a million tons of all waste is classified as hazardous waste, most of it low risk.

Indeed, the rate of traditional waste production is no longer increasing in industrialized countries /76/. This means that a century's worth of Finnish landfill waste only amounts to a pile covering about 50 km^2. In the end, this site could be readily landscaped and converted into a park. In comparison, geological uplift increased Finland's land area by about 700 km^2 during the last century.

Environmental problems associated with landfills (methane, hydrogen sulfide and other gases, damage to groundwater, gulls, crows and rats, unpleasant odors etc.) can generally be kept quite marginal these days with modest measures. Furthermore, waste can be exploited for energy, recycled, or composted. There is little danger we will drown in garbage.

Most of the opposition to landfills is little more than NIMBYism (Not In My Backyard). Opposition increases dramatically when the landfill is associated with thoughts like declining home prices in nearby areas. Even if opponents of waste management projects do not want facilities near them, they want to get rid of their own waste.

This does not prevent politicians, environmental administration or environmental groups from exploiting images, resistance and guilt associated with waste management for their own purposes.

Political and environmental exploitation can also take advantage of the human tendency to deflect to other problems, real or imagined, when facing one's own problems becomes overwhelming. In hard-ball power politics, for example, a politician may declare that society is threatened by an external enemy when domestic problems have become so serious that they threaten the power structure. Psychologists call this projection.

For example, Greenpeace recently sought to transfer outrage over German's internal problems to an image of destruction of Finland's ancient forests. The stunt received considerable public attention. The true condition of Finland's forests and the price Finns might pay for this action was never of much interest to Greenpeace or the German media.

Illusions prevailing in the Finnish mind-set

Most of us have fundamental assumptions about the world. Finns generally accept the following:

- Our bureaucracy works to serve the general good;
- Our scientific institutions represent the highest level of objective knowledge;
- Finland is a society of law and justice; and
- Finnish society is superior to others. To be born in Finland is like winning the lottery.

While disillusionment awaits those who abandon these beliefs, breaking out of the mind-set opens possibilities to see the world in the light of reason and paves the way for advancing society's larger interests.

Trust in bureaucracy is based on an illusion that public administrations work to promote the best interests of society, which, of course, is how bureaucracy should work. The reality in Finland and in the EU is sectoral administration, with various administrative sectors advancing individual agendas, often in conflict with the interests of society as a whole. Moreover, political actors have vested interests in steering policy of administrative sectors.

Like most spheres of human endeavor, state administrative bodies suffer from a tendency to exaggerate their true significance. Overstating the organizational mission is a tried-and-true recipe for expanding bureaucracy, especially when the society is actually wrestling with big problems and powerful conflicts of interest. As bureaucrats are in key positions to oversee these processes, their solutions unsurprisingly advance the interests of their particular organizations. Every solution also seems to add bureaucracy.

We all know how it is easier to buy new things than get rid of the mountains of old things accumulating in our attics, garages, and closets. Yet, while getting rid of the detritus is hard work, eliminating bureaucracy is even harder. Sectoral administration has huge resources at its disposal that it deploys whenever it needs to defend a particular position. Moreover, public administration typically lacks the mechanisms found in the private sector that are used to deal with over-staffed or incompetent departments.

At the core of the environmental administration dynamic are the EU Commission's environmental administration in Brussels and the Ministry of the Environment in Helsinki. While both organizations embrace the sustainable development ideology, they continue to treat sustainable development as little more than ecological correctness. There is also a weird territoriality that emerges from the sectoral approach that ignores the inter-relatedness of issues. Many Finns hold the odd view that the environmental administration deals with environmental problems, the economic administration with economic problems, and the labor administration with employment issues – and that somehow all these issues exist in isolation.

Practical environmental issues and the everyday problems of average people are quite foreign to senior officials working in Helsinki and Brussels. Of course, if strong central administration based on ideology was truly an answer to people's problems, the Soviet Union would still be a superpower.

Bureaucracy supports its legitimacy with its own sectoral scientific institutes. These give administrative actors credibility and increase their range of influence. There is also the organizational theme that matters are undergoing thorough study, so people need to relax and leave matters to be handled by the experts.

Finnish trust in the credibility of **scientific institutions** has its origins in our school system. The mention that a matter is under investigation or scientifically established is usually sufficient to quiet any public discussion. The self-evident superior knowledge of scientific institutes is so crushing that an average person rarely risks the ridicule for showing ignorance in the public eye – even on the simple questions that define almost any environmental issue.

Of course, the notion of the purity and objectivity of science is also over-sold. Blind faith in institutional experts has led Finland into costly miscalculations. At best we are dealing with specialist operating in a narrow field. However, we often find lack of common sense and elitism in the ivory towers of public expert institutes.

Consider the case of an EU working group on setting guideline and limit values for radioactivity levels in construction materials determined that the guideline value for a building user exposed to radiation from building materials should be 0.3 mSv/year and that the limit should be 1.0 mSv/year /39/.

They neglected to note, however, that in Fennoscandinavian bedrock area people receive already 2–10 mSv/year as background radiation without serious consequences. So how does this risk compare to more conventional health hazards like eating hamburgers and fries? What do we gain for controlling this risk with heavy handed bureaucracy and what is the cost? What about fine particulates from combustion processes that represent a far more serious health hazard? Should we evacuate the European Commission from Brussels to a healthier environment of say Shetland Island? Why does the EU use our money to procure recommendation from “experts” who don’t answer these fundamental questions?

The director of the Finnish Environment Institute has stated that her organization houses the best environmental expertise in the nation. Admittedly, the Finnish Environment Institute’s organization includes a number of fine researchers, who, for example, have succeeded in putting the nutrient sources contributing to eutrophication of the Baltic Sea into some semblance of order. They measure environmental indicators, make statistics, participate in working groups on environmental policy and do research work.

Nevertheless, the institute staff often lacks a grasp of practical matters or an understanding of economic principles. They are by and large specialists and strong believers in an ecoideology with little familiarity in providing comprehensive solutions or proportioned responses.

The institute’s funding is entirely at the mercy of the Ministry of the Environment. Can the Finnish Environment Institute be taken seriously as an expert organization or should it rather be taken as an ideologically oriented official environmental policy marketing organization hiding behind a scientific front?

Trust in the law and justice system has a strong historical background in Finland. At the end of Russian rule at the turn of the 20th century, Finns used the law to preserve their autonomy within the Russian empire. Edvard Isto's painting, *the Finnish Maiden*, shows the national heroine defending the Book of Finnish Law from a two-headed eagle, the symbol of the czar. This image is imprinted indelibly on the Finnish imagination.

Despite this ideal, legislation is actually drafted by sectoral administration bureaucrats and ministers in power at the time of drafting. Thus, when parliament considers a bill, the boundaries for passage are set by the prevailing political realities, leaving little room for structural adjustment. Rounds of hearings can be held while the regulations are being drafted. In the end, laws and standards are children of their time and only as good as the people who wrote them.

As a result of Finland's EU accession, a landslide of new regulation has been superimposed over existing Finnish law. Some of the larger inconsistencies involve contradictory aims of legislation prepared by various administrative sectors. Finnish society now finds itself entangled in a web of regulations, guidelines and interpretations.

Under the prevailing view, multiple valid decisions can coexist for a single legal issue. The question then becomes which decision is best for Finnish society as a whole or offers best balance between the primary tasks of EU. What is a true social value and what is a mere gut reaction? In the environmental sector, these issues are increasingly decided by judges.

Consider leftover stone from quarrying activity, demolished concrete, and slag from steelmaking. These materials can be processed and used, e.g. in earthworks, as aggregate materials and as insulation sand. This would be an example of legitimate byproduct use under EU policies for reuse of waste. The practice saves on the need to quarry natural gravel and sand deposits and has been done in the Nordic countries for decades with outstanding results.

A recent decision from the European court, however, revisited the quarry stone issue. The court found that leftover stone stored for an indefinite time to await possible use must be classified as waste. This means that also demolished concrete and slag from steel making is bureaucratically treated as waste if reuse is not at sight. An environmental permit is needed in every instance of "waste" use. As it typically takes months to get a permit, the advantage of using "waste" is largely lost. When such "waste" cannot be used, jobs are lost, equipment goes idle, and businesses suffer.

The full text of the EU court's ruling is provided in Appendix 5. While the court goes to great lengths to justify its thinking, it is hard to imagine the larger purpose of such convoluted acrobatics of legal reasoning.

We could ask whether the court decision is in agreement with the primary tasks of EU as stated in the second article of the treaty of Rome, whether the decision was the initial intent of the law maker or whether the high judges of justice are competent in dealing with this kinds of issues at all.

However, the policy outcome goes very strongly against common sense. Thus we should ask whether we are looking at evidence of a fundamental fault in the EU system of governance.

Belief in national superiority is common to many societies. Some societies have even been willing to impose their own take on the world on others as missionaries, colonialists, or military conquerors. History is rich with examples of the formation of such beliefs, their exploitation and how such beliefs have led to entire nations down a path to destruction. Bad policy based on such beliefs may reflect the personal psychological distress of a troubled politician /7/.

The Soviet Union developed within the umbra of socialist ideology. Belief in the administrative machinery, scientific institutes, and the inherent fairness of the socialist system was the result of massive, full-bore manipulation. Revolution became an export product. Just before the collapse of the Soviet Union, however, foreign minister Edward Shevardnadze confessed that the entire system was rotten to the core. But then the Roman Empire eventually collapsed, although not as prematurely as the projected thousand-year reign of the German Reich. Self-destructive tendencies were underlying the downfall of these societies.

Finns have succeeded in building a nation with a democratic framework that promotes individual freedoms and delivers the benefits of a welfare state. Finland is among the most competitive in the world in many international comparisons and has placed at or near the top in the three PISA studies of OECD countries in recent years. But it is also worth remembering that at the beginning of the 1990's, our country went through a financial crisis worse than most countries experienced in the Great Depression of the 1930's.

While the self-confidence of Finns has recovered since days of Finlandization and self-censorship, many of us continue to swallow the "sustainable development" ideology and "smart" policies derived from it without reflection.

Like other Nordic countries, Finland offer sustainable development as superhuman wisdom and an answer to the world's problems. Finnish environmental officials and politicians push incorporation of this ideology into the goals, principles and statements that form the basis of international agreements and EU environmental legislation. These officials and politicians also strive to make Finland itself a model of sustainable development.

Love of country and nature are admirable traits. While we all carry the responsibility for our children's future and the legacy we leave them, it is dangerous to inject illusions about our own infallibility into our policies.

Moreover, democracy is not a patent solution to social problems. If we wish to get control over the self-destructive tendencies of society, we have to be alert to this challenge. We have to have the courage to ask basic questions and try to see the larger implications of our actions. We need to tackle the most controversial issues without succumbing to our biases, illusions or manipulation. And we need to respect the rights of others including their right to decide on their own business – even when we don't agree with them.

The restoration of Lake Gallträsk – a simple local project devolves into chaos

The dangers of confusing illusion and reality are exemplified in the problems that emerged as the city leaders of Kauniainen, a wealthy enclave in the greater Helsinki region, attempted to arrange the restoration of a local lake. The difficulties encountered in this project are somewhat surprising given that the population in this up-scale area is highly educated and the city enjoys a long-standing aura of effective governance.

Within Kauniainen's 6 km^2 area lies little Lake Gallträsk. The lake has a surface area of just eleven hectares and an average depth of only one meter. The lake bottom is covered by a thick layer of sludge formed from decomposed algae and plant material. In the summer, much of the lake is covered by vegetation, particularly water lilies. The sedimentation rate is about one millimeter a year.

Most residents of Kauniainen see Lake Gallträsk as the jewel of their city. They dislike the idea of living with the stench of rotting sludge and vegetation choking the lake. They also think that with right measures, the lake could be restored to its pre-industrial glory with swimming and boating.

The first of many studies on restoring Lake Gallträsk was performed in 1967. Dredging the lake to make it deeper emerged as the front-runner option.

Three-and-a-half decades later, the Kauniainen community planning board on March 13, 2001 finally moved ahead with a plan to deepen the lake. The goal was to perform the dredging during 2001. The city solicited consulting bids and divided the project into an initial planning phase, a detailed project planning phase, and an implementation phase. The Technical Research Centre of Finland (VTT), a state institute generally held in high repute by the Finnish public, was selected as lead consultant on the project. VTT had Finnish Environment Institute as a sub-consultant. The price of the initial planning phase was set at €40,000 and the work scheduled to take five months. VTT's bid price for consulting on all three project phases was €80,000.

Several months into the project, VTT said further studies would be needed before the project could be realized. The delays and new work increased costs many-fold from the original bid. At the end of 2002, VTT delivered a research report that proposed two options compatible with the principles of sustainable development that involved either pumping the sludge and mixing it with peat, or pumping, possible dewatering of the sludge and dumping it on tilled fields. VTT recommended soliciting bids from contractors that included a statement of the contractor's strategy and price indicators. Essentially, VTT sought to compel contractors to present their own initial plans after they had already been paid to come up with one.

In autumn 2002, concerned Kauniainen residents began asking city officials what was happening with the Lake Gallträsk restoration project. Supported by an expert statement, they requested that the waste of taxpayer money should cease and the project should be put back on track.

In early 2003, they sent a letter to the city council that included a copy of the expert statement and cost estimates for several alternatives. They proposed that before the project moved on to the detailed project planning phase the city should determine how much money it ultimately intended to spend on the project.

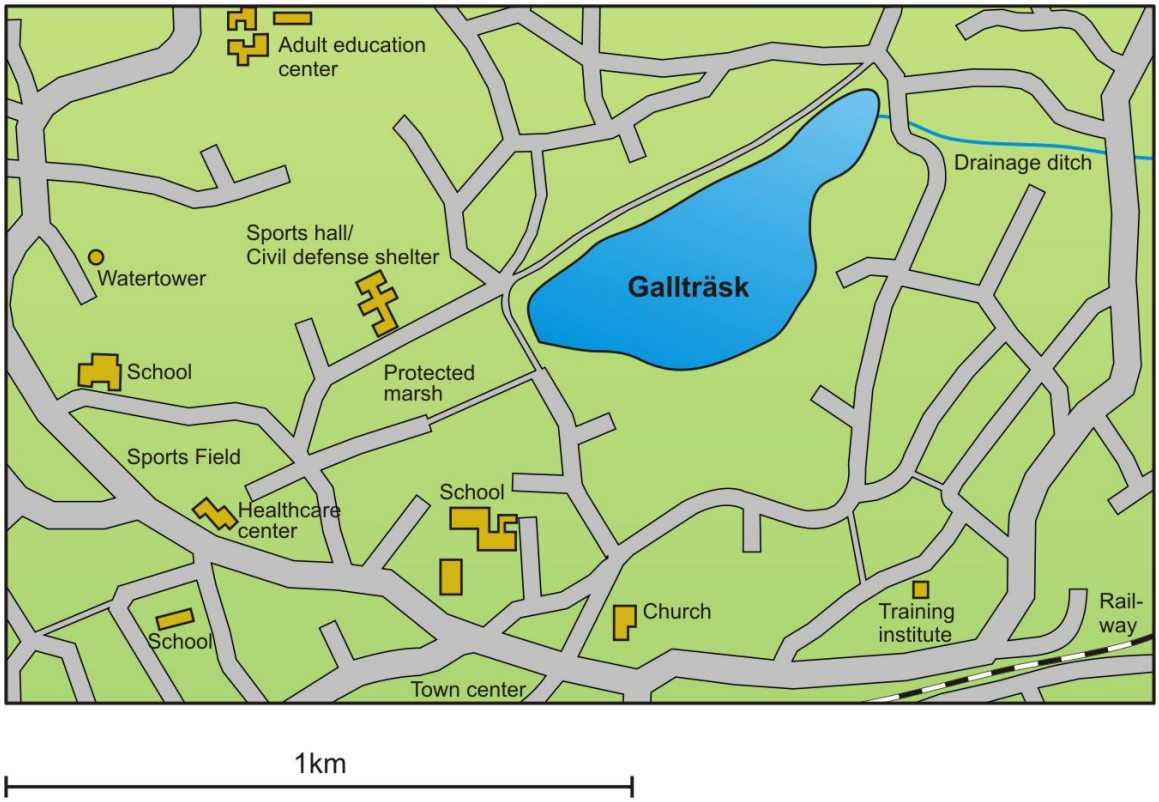
The city government, acting on a suggestion from the mayor, decided to ask for turnkey bids from contractors, an arrangement whereby the contractor would shoulder full responsibility for the project. Another consultant was hired to prepare new invitations to bid.

The bid invitations were never sent out, however, as the financial position of the city had weakened to the extent that a hike in the communal tax rate was being considered to deal with a widening budget shortfall. The project was postponed to save money. Only mild measures were budgeted to deal with the lake's eutrophied condition. The city's auditors then reminded city administrators that €200,000 had already been spent on consulting fees and that no detailed project plan had ever been delivered.

At this point the city of Kauniainen had spent 40 years trying to hammer out a feasible plan for lake restoration. Costs including the value of working hours of city officials and spending on outside consultants could have easily covered one restoration project. What went wrong?

To even a novice project manager, the cause of the failure is obvious. Any experienced private-sector project consultant would have started by assessing the costs of several basic alternatives to the restoration of Lake Gallträsk. The consultant would have identified several analogous projects and assessed their technical requirements and costs with just a few phone calls. Preparation of an elaborated survey of the available project alternatives would have cost the city around €10,000. Suggested potential alternatives are summarized in Figure 3.1.

On the basis of the preliminary estimate, the city officials could have then decided to continue or pull the plug. Moreover, if they had decided to continue, they would have been in a position to set the scope of the project and to move on to a second phase, which involves pinning down the budget and scope of the project as much as possible to give bidding contractors a clear basis for preparing their tender offers and allow for input from contractors. The final investment decision would have not been made until the second phase was complete. The city paid a dear price for failing to keep to a simple format common to investment projects around the world.



1. Dredging (40,000 m^3), mixing sludge with peat and transportation €5,000,000 + VAT

- Mixing dredged wet sludge and peat on the sports field with about 4,000 heavy vehicle trips peat and mix transport.
- If dewatering of the sludge is applied, as much as €2 million could be saved.

2. Dredging (40,000 m^3) with removal of sludge by vehicle to dumping site €2,000,000 + VAT

- Storage and loading of sludge with about 2,000 heavy vehicle trips.
- If the sludge is dewatered in two phases (e.g. chemical dewatering and filter press), the weight of sludge to be handled is reduced with total cost savings on the order of €400,000.

3. Filtration cloth covered by thin gravel layer to consolidate sludge €1,300,000 + VAT

- Risky solution, probably best as partial solution.

4. Piling up sludge (40,000 m^3) on an artificial island €800,000 + VAT

- The sheet-pile contained island would be about 60 m in diameter. Water in sludge is compressed out by overweight.
- Later removal of the island, if desired, would cost about €200,000.

5. Removal of vegetation and trash fish (as earlier) €20,000 – €50,000 each time

- Lake Gallträsk would get a minor makeover at five-year intervals.
- No improvement in recreational value.
-

Figure 3.1. A summary of Lake Gallträsk remediation options by the author.

From a technical and economical standpoint, any project to restore Lake Gallträsk is somewhat novel and demanding. Finding a feasible solution is like breaking a logjam. This does not, however, require pushing a large number of logs, but rather finding the key logs in the jam that will release the flow. The ability to quickly identify such key issues in a project typically comes from expertise and experience.

A central question in the remediation of Lake Gallträsk is sludge water content, which is about 1,500 %. In other words, the water-weight involved is 15 times the weight of the solid matter to be dredged. Placing the sludge in a pile would push out the water much like wringing out a sponge. Chemical dewatering will easily remove about half of the water, reducing the volume of the mass accordingly. After drying, the volume of the mass is reduced by an order of magnitude. These properties can be exploited both in dumping and trucking the dredged mass away from the dredging site. Here, the overall compression properties of the mass should have been determined early on through small-scale routine studies. This important task was never done. The consultants (VTT and Finnish Environment Institute) were not up to the task.

Secondly, there was a strong economic argument for not reinventing the wheel and simply following international practices for dredging of contaminated sediments. Even heavily polluted sediments are dumped and isolated in an area in the vicinity of the dredging area, because transportation of the mass to a distant site is simply too expensive and does not add value. Only the most polluted sediments are sometimes trucked to a special facility to be processed or isolated. The Gallträsk plan called for transport of dredged mass that was largely water.

From society's standpoint the main question is how a simple remediation project turned into a communal nightmare. In the following discussion we shed light on the psychological and political dimensions of how the matter was handled.

Following the community planning board's instructions, Kauniainen's environmental chief studied remediation of Lake Gallträsk and went so far as to engage some young researchers from the University of Helsinki. The researchers went to many different organizations and individuals to collect information needed to decide on an appropriate remediation strategy. Even so, it appears the environmental chief began to create her own solutions for lake remediation based on the use of peat to absorb water in the dredged mass.

At the same time, environmental issues were gaining political importance in Finnish society. Rather inexperienced people felt obliged to contribute to the discussion. Perhaps the Kauniainen community planning board honestly thought that research and development was part of the environmental head's job description and her effort were truly in the interest of the city. Apparently, a number of city leaders were swept up in this spirit of innovation – a textbook example of how political posts confer an illusory aura of expertise.

From the municipality's standpoint, the arrangement had several problems:

- In-house ideas became darlings, which made it easy to reject superior options;
- It is rarely cost-effective to develop a novel method for use on a small scale project;
- Good results are rarely achieved in a project lead by amateurs;
- The city's credibility suffered as they called around to experts for free advice to support in-house project ideas.

When the city finally committed to the project, responsibility moved from the community planning board and the environmental chief to the city council, mayor, and the head of public works (although the environmental chief retained an active role in the project). In connection with this, it was decided to hire a consultant to assist in pushing through the project. The benefit of an invitation to bid was that the consultant was expected to review all options spelled out in the invitation. The down side was that the letter requested a fixed price for oversight of the project from initial planning to completion without any indication of the scope of the project.

Two offers were submitted, but only VTT was willing to give a fixed bid. At least one party solicited to bid never bothered to submit an offer as it had become frustrated with the city's vacillation over what it actually wanted to do.

From the political standpoint, the remediation of Lake Gallträsk has long provided an intersection for the collision of conflicting interests and pressures. Lake Gallträsk's remediation has enjoyed decades of wide support among Kauniainen residents. Many city leaders have profiled themselves as supporters of such a project. For some city leaders the value of family property would be enhanced by cleaning up Lake Gallträsk. There were also a few influential city leaders who wanted Lake Gallträsk to be preserved in its natural state. The city environmental chief sought to patent a method for mixing sludge and peat and apparently one city leader handled her patent application.

It seems that the real power circle in Kauniainen was ready to push through a poorly thought-out plan of undefined scope with force. The few city leaders who expressed skepticism over early cost projections and asked what the project was actually going to cost and what the money would buy were now silenced. Yet even with the opposition quieted, the city administration felt a need to turn to an outside authority. Based on strong public reputations, the selection of VTT as lead consultant and the Finnish Environment Institute as sub-consultant appeared to be excellent sources of such authority.

The selection of such organizations as consultants was fundamentally flawed, because public research institutes are not planning consultants. Indeed, there are fundamental differences between the roles of the consultant and the researcher. A consultant must reach decisions on the basis of available information, and from that information devise a rational path to a final solution. A researcher, in contrast, may well have an excellent theoretical grasp of a single issue, but little or no experience with practical matters such as water-related construction, project planning, and project implementation.

Researchers avoid being conclusory as part of their job to be vigilant for new ideas. When they are put on the spot to provide an answer, the standard reply is "Further study is needed." In the Gallträsk case, researchers tested the use of a vibration method to pack down the loose bottom sediment. When measurements by city officials found no evidence that the novel vibration strategy did anything, the researchers merely moved on to study other approaches.

When the planning project got under way, the researchers began to do research. They continued to find new things to study, but could not shape solutions with cost estimates. The consulting costs quickly got out of hand. The idea of a robust city leadership with VTT and Finnish Environment Institute as knowledge providers began to seem like the blind leading the blind.

In the end, the city found itself considering a solution whereby the sediments were to be absorbed into peat in an experimentally demonstrated ratio of 1 to 4. Thus, heavy vehicles were to bring in 160,000 m^3 of peat to the Kauniainen sports field from a source over 100 kilometers away. At the same time, 40,000 m^3 of bottom sediment from Lake Gallträsk were to be pumped onto the Kauniainen sports field. The peat and the sludge would then be mixed at the sports field in a specially-constructed absorption process. The wet mixture would then be transported elsewhere by heavy vehicles, where it would have supplemented with the other fertilizers and then trucked further on to be spread on fields some 100 kilometers away.

Somehow, VTT concluded that a massive truck transport operation in the remediation of Lake Gallträsk was consistent with the principles of sustainable development. They even held out hopes for getting EU support. Any builder with practical experience could have calculated in a single day the potential costliness of this option, which had been proposed right at the start of the project.

Another problem was the general fixation to the belief that the dredging mass had to be transported elsewhere. This belief seems to have originated with one city leader many years ago. The complicated and costly logistics of dewatering, compression and transport were never considered, yet the belief was never dispelled or elaborated by the researchers.

The regional environmental center issued a statement that dredging of sediment with absorption into peat did not require a water permit as long as the water contained in the sediment was not allowed to flow back into Lake Gallträsk. This, combined with the promise to provide a quick fix, limited the planning options further.

In order to grasp what happened, we need to realize that Kauniainen carefully cultivates its public image. Led by wise city fathers, Kauniainen is widely viewed as one of the most efficiently operated municipal administrations in the country. The tragedy here was the city fathers apparently believed their own press. The image of efficiency comes from the lowest municipal tax rate in the country, but the city also has by far the best tax base in the country and thus a rich budget. There was strong political pressure for implementation of the Lake Gallträsk restoration project. Pushing the ambitious project through to completion after decades of studies would have stood as a monument to the power of several key politicians.

The project started with unrealistic expectations. When it was not completed, the credibility of the city government was shaken to the core. This may be why they grasped at any chance to get results by authorizing spending to yet another study.

When the citizen's committee approached the city with a statement and cost estimates, the situation reached a head. Now a range of options was available. With a little extra effort on interpreting the material, a decision could have been made on the general feasibility of the project and on the possible implementation framework.

The impulse, however, came from the outside. Its approval would have meant that the city's own efforts and the completed consulting work were money down the drain. Moreover, confess to their own mistakes was just too mentally and politically burdensome for the city's leaders. They no longer had the will to make the decisions needed to move the project forward.

Instead, VTT was praised for its valuable research study. The city formally stuck to the plan of utilizing the innovations of contractors, even though the actual conditions for implementing the project (permits, basic geotechnical data, and a general framework for the project's implementation) were never spelled out in the turn-key bid. With a single elegant maneuver, mistakes were swept under the rug.

Toward the end of the process, city officials appeared to totally lose their grip on administering what should have been a straight-forward project. The dispirited organization had become dysfunctional, due, at least in part, to demands to perform absurd tasks, conflicting pressures on officials, and the insinuation of power politics into routine city functions.

The new study of Lake Gallträsk restoration was re-launched after Kaunianen residents protested the shelving of the project. The new study suffered from a fatal planning assumption: that the winter ice on Lake Gallträsk would support the deposition of a half-meter-thick gravel layer that would sink to form a bottom lining when the ice melted and consolidate the sludge. In fact, the ice would have broken while the gravel was being spread. Currently, small-scale suction dredging and filtration of sludge with a geotube is being tested.

The significance of the Lake Gallträsk restoration project is minor to Finnish society as a whole, but it reveals a number of common features to public governance with wider significance:

- The sustainable development ideology acts as a cliché, behind which politicians and theoreticians implement their own goals at a heavy cost to society;
- The prevailing perceptions that common matters are handled efficiently and that public research institutes possess overwhelming competence are illusions;
- Sanctimonious and soaring language is often used to cover up poorly administered and dysfunctional public organization;
- Public administration would rather cover up its mistakes, even at a high cost to taxpayers, than deal with its own problems and thereby improve the public service;
- We are all at fault when we rush to judgment without taking time to consider what we really want and at what price.

4. THE FRAGMENTATION OF ENVIRONMENTAL DECISION-MAKING

It is fairly hopeless to try to explain the present environmental policy or actions of the environmental administration from a rational basis. We can clarify the picture, though, by examining sociological processes at work in the society.

The first is the fragmentation of decision-making. Environmental issues are typically tackled from a narrow ecological standpoint with scant notice to the overall impact of remedial measures on society. As a result, problems get overblown, measures regimented under bureaucratic schemes, and sector-specific agendas advanced at the expense of others.

Financier George Soros has said that all human interpretations of the reality contain some misinterpretations. In areas of human activity people's perceptions can affect the fundamentals which in turn affect perceptions.

Sociological processes are an indivisible aspect of human society. Some activities such as politics and marketing exploit these processes, generally in non-constructive ways. Recognizing these processes gives us a chance to deal with them more efficiently. The following discussion considers administration of dredging as an example.

How administration of dredging got out of hand

Dredging activities in Finland are closely associated with the development of our maritime shipping infrastructure. Such development promotes foreign trade. Dredging has traditionally been administered under Finland's Water Act. Project conflicts were earlier resolved quickly by the courts, which balanced the interests of affected groups. Large projects have been carried through without notable environmental impacts.

When the Helsinki Commission for protection of the Baltic marine environment (under the HELCOM Convention on the Protection of the Marine Environment of the Baltic Sea Area) issued its revised guidelines for the disposal of dredged spoils, the environmental administration instantly occupied the field as the chief regulator in the area. The concentration limits were plucked almost verbatim from Dutch limits. The interpretation of the guideline, that did not need any interpretation, was assigned to a researcher at the Finnish Environment Institute. Eco-ideological attitude was applied, paying little respect to common sense, accepted international practices or the intent of the law.

The HELCOM dumping guideline, the national draft application guideline with suggested limit values, and evolving social attitudes to environmental issues, had consequences:

- Several maritime infrastructure development projects in Southern and Southwestern Finland were stalled for years in their permitting processes as permit cases were repeatedly appealed;
- The administrative director of the Turku harbor was charged and fined for deepening the Perno channel. He ordered the dredging under a vaguely worded water permit in order to allow departure of cruise ships worth a total of €2.5 billion from shipyard;
- The dredging monitoring and follow-up studies under the new guidelines sometimes cost as much as the dredging itself;

- In several cases, officials required that dredged mass be taken ashore, and the responsible party had to obey to keep any reasonable schedule;
- To protect fish during spawning season, temporary bans were routinely placed on dredging operations, causing delays, increased costs, and disruptions in harbor and channel development projects.

As the situation got out of hand, the Ministry of Communications and Transportation, the Finnish Maritime Institute and main harbors involved in foreign trade launched a project to consider environmental impact and permitting processes /10/.

It was found that the HELCOM dumping guideline had been copied from the Oslo-Paris Convention (OSPARCON) on the North Sea, which had been motivated by the dumping of tens of millions of cubic meters of contaminated sediments annually from inland water areas to the North Sea. Powerful tidal currents and sea waves then churned up the dumped masses and carried the suspended solids back and forth.

In Finland (and in other Baltic Sea areas), most dredging involves transfer of dredged masses from one point to another at sea. The currents are weak, tides are negligible, and no notable erosion occurs in dumping areas. Thus, the language of the HELCOM dumping guideline is quite inappropriate for Baltic Sea circumstances.

Of course, the HELCOM dumping guideline might have been possible to interpret if readers understood its background. Instead, Finland's environmental administration refused to answer the question: "What is the environmental pollution or its risk in dredging operations that the Environmental Protection Act and the dumping guideline are supposed to prevent?" The environmental administration worked under an assumption that some inherent wisdom was contained in the dumping guideline wording. If the wording of the HELCOM guideline did not please people working in the administration, it could always be tightened up in the Finnish interpretation guideline.

Many difficulties were precipitated by the Finnish Environment Institute's interpretation, which said that the hazardous substance content of individual samples or sample fractions, and not just the sample group average, should also be taken into consideration. Thus, if a tiny area of surface sediment was found to exceed the upper limit value, it would need to be scraped up carefully, brought to a site on land, and treated as hazardous waste.

The ecosystem, off course sees the mean value and compares this to the mean of surface sediments at the dumping site.

Another odd interpretation of the HELCOM dumping guideline and the environmental protection act was that if the content a certain harmful substance in the dredging mass exceeded the upper limit, the mass should be brought ashore for treatment and taken to a special site.

Such interpretations do not come cheap. For fine-grained sediments, dredging and dumping typically costs around €3/m^3, dumping of contaminated sediment and covering with clean sediment €5/m^3, scraping off of contaminated surface sediments with dumping and stabilization on the bottom of the harbor field €20/m^3, scraping off and bringing ashore with transport to a hazardous waste site around €100/m^3, and scraping off, bringing ashore and transport with processing and placement at a special hazardous waste site €200/m^3.

If hazardous substances are detected during routine dredging operations, the environmental protection act calls for application of the principle of environmental best practices (i.e. the appropriate, cost-effective combination of measures). In defining the technical solution, the principles of cost-efficiency and proportionality (the measures appropriate relative to the selected level of protection) should be considered.

Indeed, this is stated unambiguously also in the HELCOM dumping guideline. Water dumping of contaminated sediments and covering with clean material or other forms of confining area are widely used elsewhere. The interpretation of the Finnish Environment Institute contradicted the environmental protection act.

When a representative of the Southwestern Finland environment center was confronted with these facts, the response was as follows:

- The representative first reacted with disbelief and dismissal.
- The representative then defended the actions of the authorities.
- The representative next made a veiled threat of serious consequences to the project owner questioning the actions of the authorities.
- This was followed by a call for further investigation and more studies at the expence of the project owner.
- Finally there was a reference to some internal guidelines for environmental authorities.

When the implications of dredging were brought up at a seminar on environmental impacts of sea traffic, the construction chief of the Pori harbor asked the Finnish Environment Institute researcher drafting the interpretation guideline of the HELCOM dumping guideline: "The Kokemäki River brings suspended solids containing some mercury into the sea. Part of these solids settle in our harbor area. What is the problem with taking this sediment from the harbor and dumping it in the river's sedimentation area next to the harbor?"

The researcher responded, "There is no real problem, but once the sediment is contaminated, you have an ethical duty to take it ashore and deal with it." Silence descended on the hall. Another representative of the Southwest Finland environmental center tried to calm things by stating, "Sure we know the real problem lies with the Harjavalta smelter (the legal source of the mercury) upriver."

The Finnish Environment Institute's heavily criticized proposal of how to interpret HELCOM dumping guideline was eventually rejected. Yet even after this some regional environment centers used the rejected proposal as their dumping guideline instead of the HELCOM guideline. Even after decades of studies, monitoring and modeling of turbidity effects, impacts on the fishing and other environmental risks, the regional environmental centers and the fishing unit still demanded new studies on top of the old studies. Projects were routinely required to conform to seasonal limits although the turbidity impact studies had shown them in most cases unnecessary.

If environmental officials are incapable of dealing with environmental issues, it is hardly surprising that private individuals, associations, and municipal environmental boards increasingly feel empowered to file comments and complaints. These comments and complaints contain ever more surprising views than the Finnish Environment Institute on the environmental impacts of dredging and the HELCOM dumping guideline.

When tributyltin re-hit the headlines in connection with the Vuosaari harbor project, the national interpretation guideline project got new wind in its sails. Then environment minister Jan-Erik Enestam asked that the interpretation guideline be prepared before the environmental permits on the Vuosaari dredging project were handed down. The new draft guideline now covered both dredging and dumping. The following legislation and agreements needed to be considered in connection of dredging projects:

1. The Water Act
2. The Environmental Protection Act
3. The Sea Protection Act
4. The Waste Act
5. State Council decision on landfill sites
6. The Environmental Damage Act
7. The Nature Conservation Act and the Antiquities Act
8. The Land Use and Construction Act
9. EIA procedures for dredging and dumping
10. International agreements
11. European Community legislation

The draft guideline also included descriptions of the possible environmental impacts of dredging and dumping activity under the following headlines:

1. Impacts of harmful substances
2. Changes in water quality
3. Water vegetation
4. Bottom organisms
5. Fish
6. Currents
7. Commercial and recreational fishing
8. Other recreational uses
9. Impacts on undersea structures and use of sea bottom
10. Impacts of transportation and temporary storage
11. Impacts on biodiversity

A permit application for a dredging project required the following:

1. Definition of the scope of dredging and dumping needs
2. Assessment of the measures presented in the permit application
3. Evaluation of sediment quality: physical, chemical and biological properties and impacts
4. Sediment sampling
5. Dumping site details
6. Evaluation of dumping options
7. Impact assessment

The quality criteria for sediment were stated in the new draft guideline. The lower limit for TBT was set at 3 µg/kg dry weight solids and the upper limit 200 µg/kg dry weight solids.

During the Ministry of the Environment's hasty comments round, it was once again told of the magnitude of impacts, current international practices and limits elsewhere. The comments on the proposed guideline acknowledged that no other country applied such strict limits to TBT. Furthermore it was told that the proposed administrative measures are at odds with Finnish law and government efforts to encourage job creation.

In May 2004, the Ministry of the Environment published a slightly tuned version on the dredging and dumping guideline. The strict limit values were allowed to stand as part of a wait-and-see strategy. The Ministry said it would issue a decree on new limits later.

The emerging of heavy-handed environmental bureaucracy to regulate dredging projects is a fascinating area of research. It includes the following relevant facts:

- Some Finnish environmental researchers and officials first created a view that the dredging and dumping of sediments containing harmful substances posed a serious environmental threat from one-sided international information. Their view was strengthened by enthusiasm over challenging new research opportunities, desire to develop know-how and total lack of expertise.
- The newly manufactured threat to the Baltic Sea was an instant hit with the media and political classes.
- Once the Greens gained top posts at the Ministry of the Environment, they bent policy to fit their own political objectives. Civil servants in the Green network were given important tasks, subjugating the Ministry's operations to totalitarian views. This development was not unwelcome, because the Greens and the environmental administration largely shared the interests of expanding their domain of power. The importance of environmental issues was growing in the larger cities and the officials were free to operate to their heart's desire.
- The prevailing view in the environmental administration was that harbor operators were getting off easy. The views and aggressions of environmental administration officials manifested themselves as a desire to discipline and control. Instead of using risk analysis to define the problem, the environmental administration went straight to draft a guideline and limit values for sediments. The relative size of the problem was never an issue.
- Officials fed the media with interpretations of sampling rules and data in direct contradiction to the HELCOM guideline and international practice. The hazardous substance content in a single outlier sample was compared to limit value with great publicity. This further reinforced the widely held perception in the public of dredging as a shady activity and environmental threat.
- As if those developing the national maritime infrastructure were not already miserable enough, the environmental administration sought to bolster its profile as defender of the general welfare by imposing more harsh rules and entering into legal disputes with permit applicants. Officials found it easy to deal with troublesome applicants by calling for further monitoring studies of the impacts of dredging on the environment and fishing stocks. Indeed, the key adequate ground of regional environmental centers for demanding studies was the developers had the money to pay for such studies.
- The situation became awkward for environment and fisheries officials, however, when studies and investigations identified no real problems from dredging activity. It appeared that these officials had engaged in frivolous abuse of their authority by requiring massive amounts of unnecessary studies and abuse of the appeals process to oppose development of the national maritime infrastructure.
- Ironically, the general public continued to side with the environmental officials, especially suspicious fishermen, summer house owners happy with the status quo, and

city-dwellers looking for a target for their aggressions. These groups would have felt betrayed if the environmental administration, after so much study, issued a public apology to marine infrastructure developers and withdrew their demands.

- The histrionics surrounding the Vuosaari TBT issue breathed new life into efforts to tighten regulations on dredging and dumping activity. As several harbors had already made their basic investments, it was to their advantage to keep quiet and let the new, harsher rules be imposed on competing harbor projects.
- Using the new guideline, the environmental administration effortlessly buried its mistakes and occupied the field in this matter. As the guideline was not official, it continued to evade broader political review. Moreover, Finland's environment minister had established himself as a defender of the Baltic Sea. Finland had become the model for sanctimonious environmental policy also in this area.
- The final outcome was fairly predictable, given that the media covering the environment minister's political wisdom had kept to the official narrative, and thereby avoided the far more difficult problem of changing the narrative while maintaining credibility. The legal rights of those developing the national maritime infrastructure were coldly ignored.

We Finns consider US Iraq policy with manufactured evidence as mindless and deeply deplore the prisoner humiliation at the Abu Ghraib. We also consider Silvio Berlusconi a buffoon, manipulating the Italian people through his media empire. Our prime minister has considered it appropriate to advice Russian leadership about the lack of investor protection in their country.

Our sense of self-righteousness prevents us from facing the harms that Finnish society, led by the environmental administration and the media, have brought upon those involved in productive activities in general and development of maritime infrastructure in specific. Our society accepts a manipulated view of the facts and tolerates abuse of fundamental legal protections. It humiliates organizations working to increase the national prosperity by forcing them to make unreasonable economic sacrifices. It destroys possibilities for implementing infrastructure projects that would reduce our dependence on fossil fuels.

All this has occurred for reasons that have practically nothing to do with the state of the environment.

Environmental problems everywhere

The overblown administration of dredging activities is not an isolated occurrence in environmental administration. Here are a few other recent examples:

- The European Commission is seeking to ban the sale of Baltic herring because of too high dioxin levels. The Finnish journalist Aarno Laitinen, has pointed out that to get the same level of dioxin poisoning suffered by Viktor Yushchenko during the 2004 Ukrainian presidential campaign, one would need to eat 210,000 kilograms of Baltic herring at one sitting.
- Environmental officials intervened in the demolition a swinery owned by Finnish MP Heikki A. Ollila. The parliamentarian had failed to take demolition waste from the site to waste management system in a timely manner. Mr. Ollila was even suspected of burying concrete blocks on his own land – an environmental crime under bureaucratic interpretation.

- A new decree forces over 300,000 rural households in Finland to invest into new waste water treatment systems costing 5,000 – 10,000 euros per set or a total of 2 – 3 billion euros. Many of these new systems do not work and some pose a health hazard. The decree is supposed to protect the Baltic Sea from further eutrophication. The Finnish journalist Martti Backman has calculated that the theoretical cut in phosphorus load to the Baltic Sea is 0.2 % and in practice one order of magnitude less as most of the phosphorus is attached to soil particles long before reaching the sea. Indeed a 10 kg package of ordinary garden fertilizer poses the same threat to the Baltic Sea as a rural human being in the old system in three years.
- A small company selling natural stone to gardeners found itself in a fight for survival after cleaning a 200 meters long ditch near the Natura 2000 protection area of Lake Matala. Lake Matala's aquatic vegetation includes the rare lake grass *Najas tenuissima*.
- The presence of a long-legged 6 mm beetle (*Macroplea pubipennis*) or the Northern Bat (*Eptesicus nilssoni*), both of which have been declared endangered species in Finland, has also become a basis for restricting land use. Interestingly, the environmental administration has not seen any need to invest its own money in habit for these species.
- Noise nuisance has become a defining issue in the siting of offshore wind farms in Finland. Depending on wind speed, of course, modern wind turbines produce average noise levels around 60 dB measured at the base of the tower. This is comparable to the noise level of normal speech. The guideline threshold value for protected areas like protected sea outcroppings is 45 dB during daytime and 40 dB during night time (Council of State decision 993/92). The background noise of a 10 m/s sea breeze already exceeds 45 dB.
- New limits on release of heavy metals (so-called "national priority materials") are being considered for industrial facilities next to rivers that naturally carry many dozens of times as much of the same heavy metals to the sea. The critical values for heavy metal content being presented are a fraction of the guideline values for heavy metal content in drinking water.
- Under Directive 86/278/EEC, the heavy metal content in sludge from an ordinary sewage treatment plants is suitable for spreading on fields. Yet under Finland's SAMASE criteria, the same sludge is so contaminated that it must be placed in a special landfill.
- One municipal environmental official in the Helsinki region has come up with a demand that a landscaping permit is to be required in urban areas for the cutting of diseased trees that pose a threat to people or property. This is supposed to be good governance.

Underlying these and many other astonishing cases are the same sociological processes as in the dredging and dumping bureaucracy. Finnish society, feeling both guilty and sanctimonious at the same time, washes its hands of responsibility with an obsessive intensity. Our nation clings to a dream of people frolicking in a bucolic idyll in clean linen clothing among butterflies and lambs, oblivious to the realities of every-day existence.

Sustainable development action committees

The politics of sustainable development in their current incarnation emerged from the UN's Brundtland Commission report /65/. According to Finnish interpretation, sustainable development is a continuous process at the global, regional and local levels, intended to preserve a good standard of living for current and future generations. Sustainable development is seen as whole, with ecological, social and economic ramifications.

Finland established its National Commission on Sustainable Development in 1993. The Commission, which is led by the prime minister, and includes ministers, high-level state officials and other players, meets to discuss various themes mentioned in the work program. It claims to be promoting sustainable development by assigning priorities, by acting as a forum for discussion, and by providing initiatives for official preparation. The Commission is supported by the state bureaucracy and has the economic resources of the Council of State.

The fruits of the Commission's work include government's sustainable development program, a national action plan for Finland's biodiversity, a program for ecological construction in accordance with sustainable development principles, an environmental cluster program, a program for sustainable development of a knowledge-based society as well as a program for sustainable production and consumption.

Within the context of the Commission's work, models for structural change are also being developed to assist in the shift to a society governed by the principles of sustainable development. The government is supposed to play a central role in all stages of structural adjustment (the "breaking loose" stage, the "acceleration" stage, and the "balancing" stage).

To secure the conditions for a good standard of living for current and future generations is an excellent goal, but certainly nothing new. The decision to build ecological, economic and social pillars looks like an ideological structure. More concrete and immediate problems identified in the original report, particularly difficult problems facing people in developing countries such as explosive population growth, famine, desertification, pollution, poverty, illiteracy, unemployment, lack of a social safety net, and war are pushed aside.

It is worth mentioning that the author was able to locate a copy of the Brundtland Commission Report in the basement of the Helsinki University of Technology, where it had been moved into storage because of low demand. In other words lots of people speaking about the principles of sustainable development have not taken the time to familiarize themselves with the crucial source document.

Barring a surge in immigration, Finland's population is set to decline and gray as the average age of the population increases. Some observers even speak of a "pension bomb." At the same time, tighter international competition and globalization threaten jobs in Finland. State secretary Raimo Sailas has suggested that the Finnish economy could wither away.

Finnish society has already experiencing increasing problems with unemployment, marginalization, violence, alcohol, drugs, crime, and worker burn-out. The collapse of the social security systems and unbridled social trends from an economic collapse would cause further social destabilization.

What actually threatens the ecological conditions for a good life in Finland? Finland's overall eco-balance, as shown earlier, is headed in the right direction. Industrial pollutants have been dramatically reduced and constitute little threat to us or future generations. For example, fertilizer problems from agriculture still require action, but are hardly a threat to the quality of life in Finland.

Sauli Rouhinen, the secretary general of the Finnish National Commission on Sustainable Development was asked: "If we exclude fossil fuels from the discussion, where do we Finns meet our ecological borders with the current pace?" The response was that from this perspective Finland probably lives within its ecological footprint.

Sustainable development globally has social, ecological and economic dimensions, but the emphasis varies across time and space. Every problem has a core issue; not all problems can be solved simultaneously. Thinking globally, controlling the population explosion would solve many problems and pressures on the environment.

So what is the sense of the new Finnish ecological thinking? Why should we intensify the efficiency of our material use by a factor of four or ten at this particular moment? Is material use as timely a problem as energy use? We consider these issues in the following example of house construction.

Housing and sustainable development

In its construction policy program /73/, Finland's Council of State notes: "The principles of lifecycle economics and sustainable development are to be observed in the fields of construction and real estate throughout the entire chain from municipal planning, zoning, and building design to construction, use, maintenance, renovation, and decommissioning. In project planning, the creation of lifecycle and environmental analyses should be as routine as cost calculation. Waste from building activity and demolition of structures should be minimized and the reuse of building materials increased. When possible, the reuse of building materials and components is preferred to dumping of the demolition waste."

On its face, this policy sounds quite rational. But what are the magnitudes of various environmental impacts and where does this analysis lead us? This problem is addressed with elementary calculus in the following case study.

Case: Environmental impact of a four-person family home in the Helsinki suburbs

Assume a family house in the Helsinki region. Annual energy consumption (heating, hot water, lighting, and other electrical appliances) is 108,000 MJ. The house is built for a service life of 100 years. Estimated amount of materials and energy tied up in the house is:

Materials	Amount	Energy content	Non-renewable energy
Brick	20 tons	3.2 MJ/kg	64,000 MJ
Mortar	6 tons	1.2 MJ/kg	7,000 MJ
Concrete	40 tons	0.6 MJ/kg	24,000 MJ
Mineral wool	4 tons	20 MJ/kg	80,000 MJ
Lumber	8 tons	1.2 MJ/kg	10,000 MJ
Chipboard	2 tons	10 MJ/kg	20,000 MJ
Drywall	6 tons	7 MJ/kg	42,000 MJ
Bitumen felt roofing	1 ton	5 MJ/kg	5,000 MJ
Glass	0.5 tons	8 MJ/kg	4 000 MJ
Tile	2 tons	5 MJ/kg	10,000 MJ
Steel and other metals	2 tons	15 MJ/kg	30,000 MJ
Other materials	2 tons	10 MJ/kg	20,000 MJ
Energy used at building site 160 m^2 x 400 MJ/m^2			64,000 MJ
Renovations (1 + 2)	6.5 tons	8 MJ/kg	50,000 MJ
Total	100 tons		420,000 MJ

According the technical data sheets by the Finnish building industry, the amount of energy invested in manufacturing and transport of construction materials, as well as the amount of energy expended on construction itself represents only about 4 % of a building's energy consumption over its life. Thus, it is difficult to see how the choice of material has a significant impact on the amount of energy tied up in the structure or energy efficiency.

The environmental impact of energy use under the current energy production structure with assumptions presented in Appendixes 3 and 4 is about -1.5 km² eq. x year and a footprint effect of construction waste at the landfill about - 0.0001 km² eq. x year.

Buildings account for about 40 % of Finland's energy consumption. If the goal is to significantly reduce CO_2 emission under the current energy production structure, part of the building stock must be replaced. Another part must be renovated with emphasis on HEPAC systems, windows, outer doors, increased insulation and better seals.

Moreover, construction materials are largely rock, minerals, or wood. Rock, concrete, bricks and other minerals can be crushed and wood can be burned, but at some point the economics of recycling and reuse no longer holds. How much a problem is really created by extracting rock and wood from nature and returning back after a century of use?

Thus, priority should go to energy efficiency, rather than selection and reuse of building materials. The tons of carbon dioxide expended on new construction and renovation represent far less than a tenth of the energy use of the building during its life. The selection of materials for normal construction, the amount and recycling of construction waste are marginal issues relative to the other challenges in mankind's future.

Based on these calculations, the sustainable construction policy program seems to be on the wrong track with respect to its eco-thinking. Nothing new has been invented, and the only viable observations are familiar energy efficiency and quality issues. To learn these mundane truths, however, our officials now have to travel around the planet to eco-building conferences. Our public administration research institutes year after year pump out the same empty baroque prose filled with politically correct tributes to the construction based on the principles of sustainable development.

The highest civil servant at Finland's Ministry of the Environment has joined with Germany's environment minister in expressing horror over the problem of construction waste. She has asked those in the building industry to figure out what is to be done with all this waste. Some environmental officials, for example, want to restrict around-the-year habitation in simple circumstances such as summer cottages on the basis of sustainable development principles. On the other hand, the construction policy program recommends reuse of structures.

Sustainable development can thus be marketed in a variety of contradictory incarnations in the construction sector. The environmental administration uses it for self-initiative and emphasizes of the significance of its own agenda. State administration research institutes have found fresh marketing arguments for their own work. Large construction firms have begun to use fashionable eco-images in their marketing.

Once the notion of sustainable development principles has been adopted, inadequate grounds for decisions or programs are tolerable. Nobody bothered to ask the simple questions that could have been answered and rationally assessed before the construction policy program draft was finalized.

Political realities and impressions matter most in a decision-maker's world. Indeed, expansion of the sustainable development ideology to the construction branch has not has hurt the government. Many people have bought into the idea that somebody in government is doing something about a "problem".

Once Finland's construction policy program had gained political acceptance, there was no benefit to voluntarily admitting to a mistake. Small and medium-sized companies operating in the construction field increasingly face dire circumstances caused by the actions and demands of the environmental bureaucracy. They have little choice but to go along with the whirlwind of image marketing.

Eco-management systems and eco-labeling – modern indulgences?

The European Union and industry have responded to political pressures connected to environmental matters by developing eco-management and audit schemes. Under such schemes, the firm or the organization reviews the environmental impacts of its operations, decides on an environmental policy, commits to continuous improvement of its level of environmental protection, makes an environmental action program, and periodically prepares and audits environmental reports for interest groups. The data on emission trends are especially enlightening.

Many standard bureaus and other organizations issue eco-labels. The idea is that the label is granted to products with lower environmental loading than similar products in their class.

The bureaus and organizations may also grant recommendations to particular products or methods they consider eco-friendly. Public procurement officials can justify selection of goods or services that would otherwise lose in competitive bidding by pointing to environmental reasons for their decisions.

Environmental management systems may be beneficial tools, especially for large industrial firms seeking to manage their environmental impacts better than the limits of the law. The problem is the reporting rarely addresses the scale or significance of individual environmental problems. Important and unimportant problems are considered side by side.

It is useful for companies to know the environmental impacts for the full lifecycles of their activities and products. It would be even more beneficial if the overall relative significance of these impacts were also considered. Such information could also be useful to the consumer.

The operations of most firms and productive organizations have minor environmental impacts. In such cases, the establishment of eco-management systems makes little sense. Environmental issues can be dealt as a part of the quality management system.

On the other hand, a single activity or product line of certain companies and organizations may have substantial environmental impacts. The energy efficiency of the activity, the carbon dioxide and particulate emissions from energy production, agricultural nutrient releases, the ability of fish stocks to replenish themselves, the risk involved in transport of oil products and chemicals, and even the use of antibiotics, are all examples of issues deserving good management.

The use of eco-labels is problematic since the criteria for labeling are vague /4, 49, 50/. Issues of proportionality are often ignored. Currently, the process of granting an eco-label is a black box. There is little likelihood that the criteria used could withstand critical inspection. For example, is green toilet paper more eco-friendly than normal toilet paper if it has to be folded twice?

At best, environmental management systems are tools for companies and organizations to limit their impacts in a cost efficient manner. Eco-labels and technical data sheets can guide consumer behavior and through this, companies and organizations.

There are two sides to this coin, however. Eco-labels and eco-management systems can also be used to prey on the guilt feelings of the consumer by offering a way to assuage his conscience. When consumer choices are linked to marginal environmental impacts or the principles for conferring the eco-label are vague, environmental systems and eco-labels become tools for mass manipulation. When issues of relative significance are pushed aside, environmental justifications become the tools of protectionism in public procurement and sow the seeds of social decay.

What product groups have the most environmental impacts, and in which product groups does greenness make a significant difference? Why has this critical question been ignored in eco-management systems and eco-labeling, as well as in public procurement processes? Is there a drive to create a pan-European bureaucracy for the sale of eco-indulgences? Are research and standards bureaus attempting to extend their scope of business? Are large corporations exploiting these systems and labels to their own benefit, when smaller cannot afford to play the same game?

Sectoral administration problems and the environmental administration

In principle all public administrations should work for the good of the society. In practice, however, the operation of an individual organization is disturbed in pursuing this goal, as it has a tendency to put its own issues and interests above everything else.

The consequences are summarized in the charts in Figure 4.1, which considers a hypothetical environmental problem that can be partially or totally eliminated. However, the eco-balance of doing this is not necessarily positive. There can also be knock-on effects leading to perverse results like magnifying climate change.

Indeed, the environmental administration does not even consider the impact of its actions in terms of eco-balance, due to a lack of appropriate indicators and the fact that the environmental administration itself is divided into competing sub-sectors. It would be interesting to see the energy consumption, for example, for recycling of waste or remediation of contaminated land. Obviously, there must be a limit also from the environmental standpoint where recycling or remediation activity ceases to confer a net benefit.

The costs of dealing with the specific problem generally increase exponentially in accordance with the law of diminishing returns. Finland's environmental administration generally seeks to deal with a problem thoroughly, which sounds good politically when somebody else pays. However, when the starting point is already close to optional, achieving a much lower target level makes little sense.

The ultimate price to society also goes beyond the cost of the measure itself, as it may have to be paid in terms of e.g. loss of industrial competitiveness, higher unemployment or degradation of social justice.

Figure 4.2 suggests several problems in the area of environmental administration. The cubes represent the relative size of problems, for example, Finland's contribution to climate change, Finland's contribution to Baltic Sea problems, and Finland's waste management issues. The figure illustrates the effectiveness of different approaches to tackle the problems.

The approach using guilt and purification rites may not be particularly effective in dealing with environmental issues as they blur the boundaries between existing and invented problems. This setting is appealing to the environmental administration since it makes everybody else sinners and gives the administration the role of merciful shepherd.

The sector-by-sector approach doles out the same heavy-handed treatment to large and miniscule problems alike. True, this approach achieves some results in important matters but may cause more harm than general good when dealing with small or minuscule problems. The sector administration is used to this traditional approach and likes the safety it provides.

From society's standpoint, it makes sense to prioritize the deployment of resources so that they are focused on the most important and timely problems. Indeed, such an approach might even achieve progress in dealing with other problems. For example, if we focus on reduction of greenhouse gas emissions, one source of Baltic Sea eutrophication and the amount of waste are also reduced. Such a prioritizing approach, however, is strongly opposed by sectoral bureaucrats as it upsets their own structures and challenges former actions.

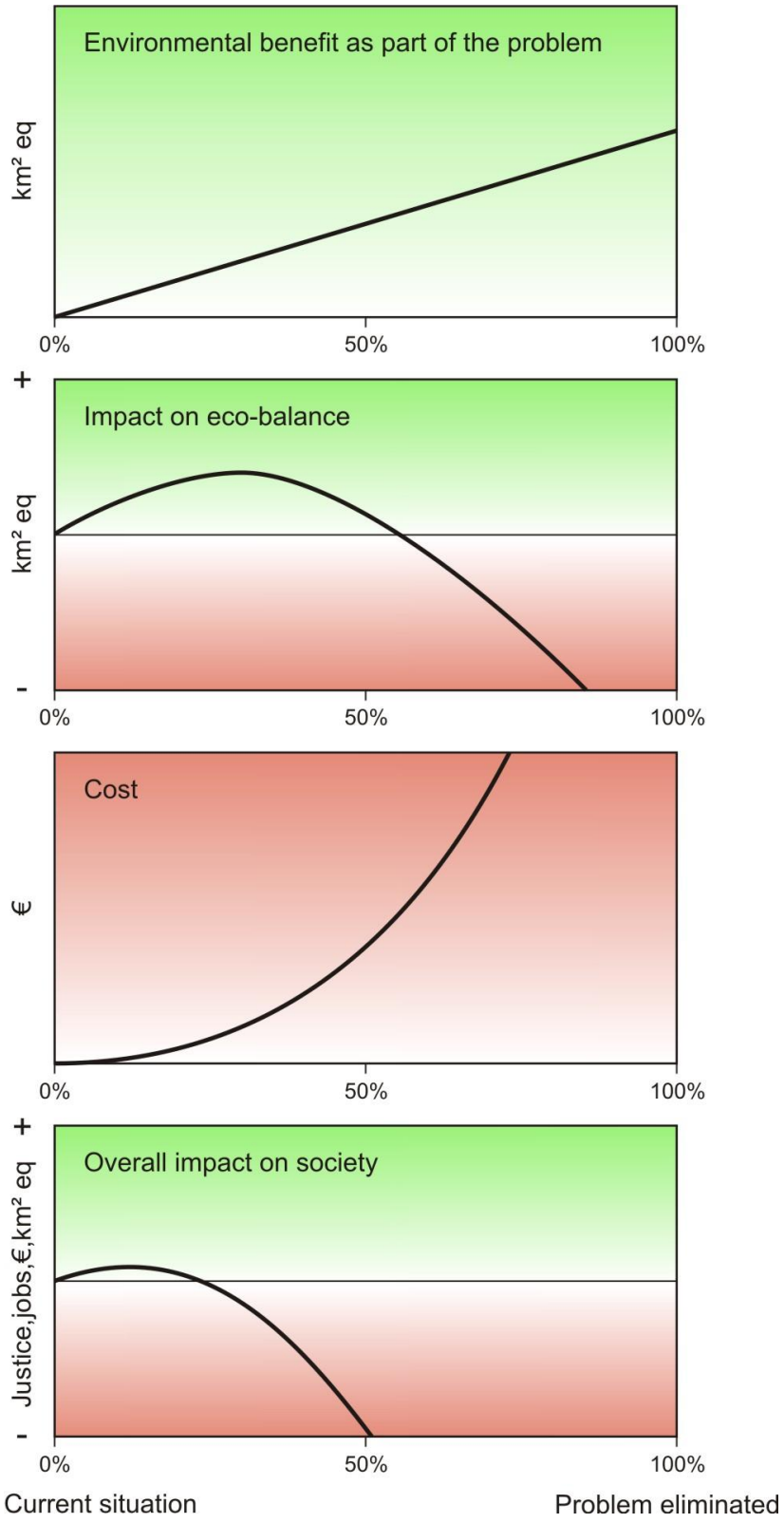


Figure 4.1. Consequences of dealing with a given environmental problem as a function towards total elimination.

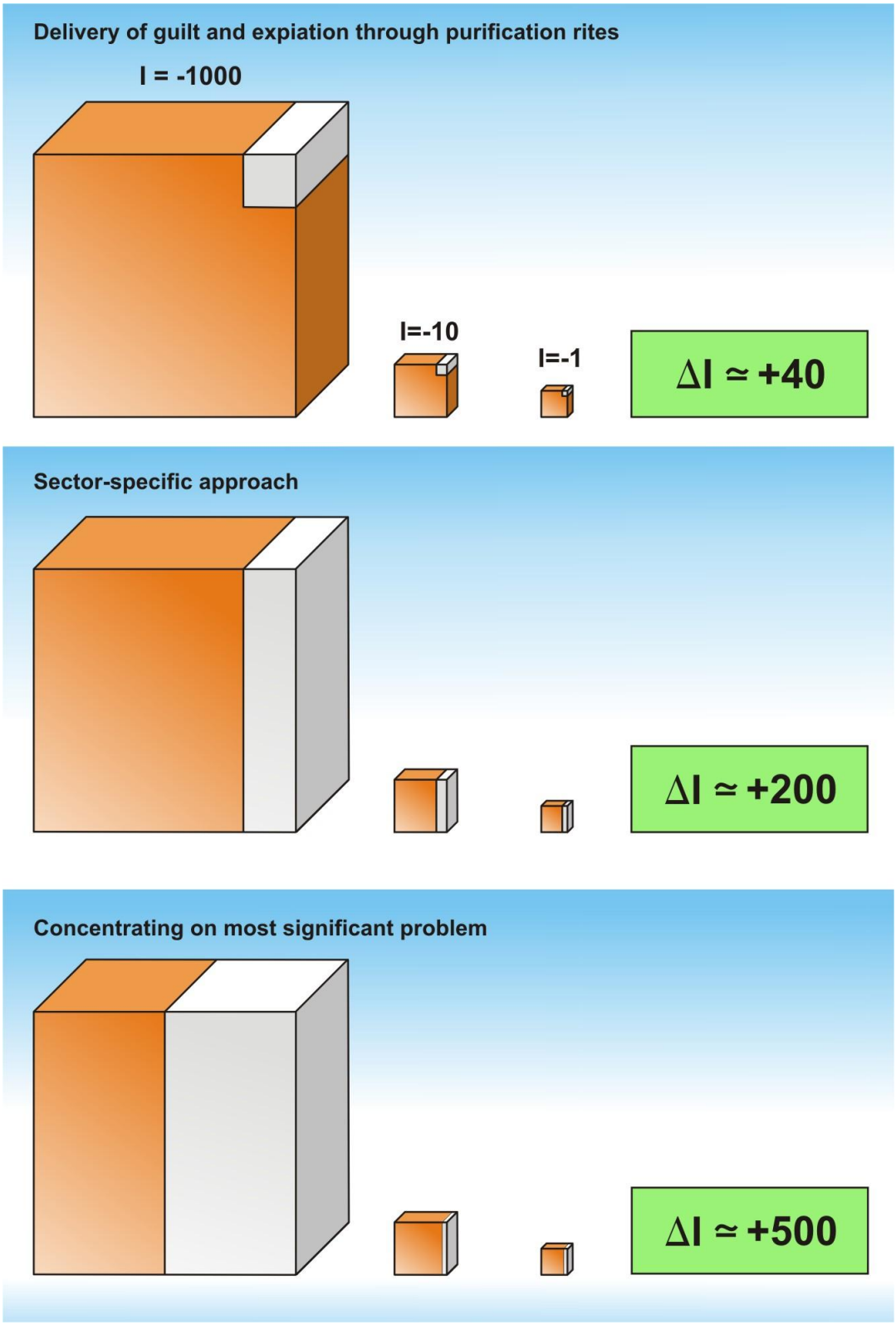


Figure 4.2. The effectiveness of different approaches in managing big (e.g. Finnish share of climate change), small (e.g. Finnish impact on the condition of the Baltic Sea), and minuscule (e.g. Finnish waste management) environmental problems.

A central tenet of the Finnish environmental protection act is that best available techniques should be used when an activity causes or may cause damage to the environment. Best available techniques mean the most efficient and advanced technically and economically feasible methods or means to preventing harm to the environment or effectively reducing such harm.

The environmental protection decree lists things to be considered in determining best available techniques, including:

1) Reduction of the quantities and harmfulness of waste;
2) The hazards associated with the materials involved and the possibilities for using less hazardous substitutes;
3) The materials used in production and the possibilities for reuse of the waste generated by the production process;
4) The nature, amount, and impact of emissions;
5) The type of raw material used and their consumption;
6) Energy efficiency;
7) Risks related to operations, prevention of accidents, and limiting the impacts of accidents when they occur;
8) The timeframe and plan for implementing best available techniques, as well as the costs and benefits from preventing and limiting emissions;
9) All environmental impacts;
10) Methods in use at the industrial scale for production and emissions control;
11) Development of technological and scientific knowledge; and
12) Published information about best available techniques from the European Commission or other international bodies.

Figure 4.3 present a flowchart of how the environmental permitting process should work under the environmental protection act. It provides a revealing insight into bureaucratic aspirations: all matters are considered, information is shared, and everybody is heard.

While the system appears to be close to perfect, several fundamental questions deserve consideration, such as:

1) What is the system based on since it ignores the relative size of problems?
2) How is an average permitting official or regulator supposed to assess best available techniques under the law and statutes?
3) Why is it necessary to put someone seeking to build, say, a cow barn, amusement park, or a commercial shipping dock through so much red tape?
4) How good are the best available techniques if it may take up to ten years to get a particular technology recognized in case of a dispute (Figure 4.4)?
5) Where are the legal protections for the project promoter or entrepreneur if, say, an environmental official demands an expensive investment to deal with a relatively minor environmental impact or extremely low probability risk?

Finland's environmental protection act is an implementation of the EU Directive 96/61/EC concerning integrated pollution prevention and control. In drafting the Finnish legislation, the scope of the directive was broadened to many other activities.

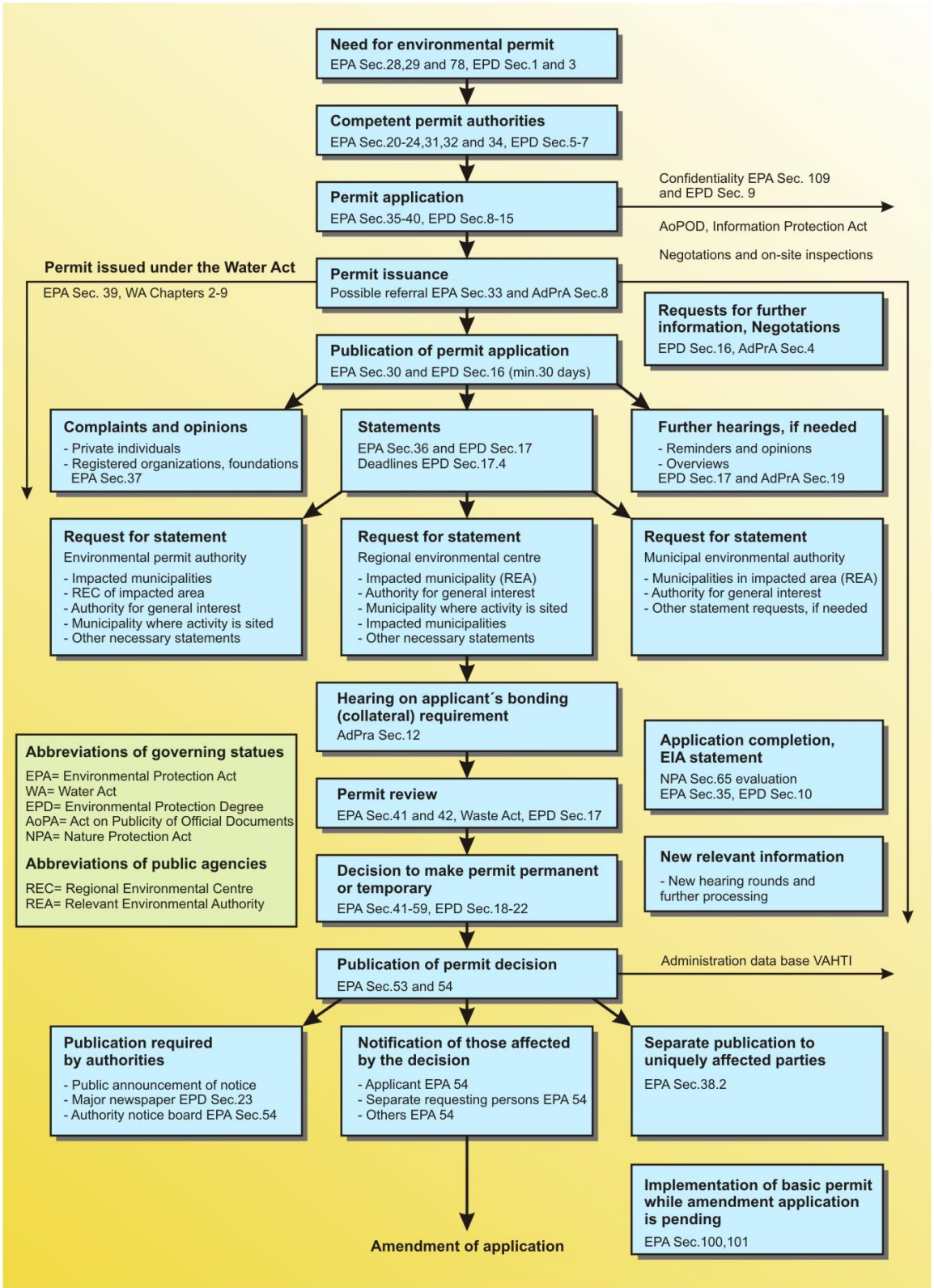


Figure 4.3. Schematic flowchart of the environmental permitting process from the official's perspective.

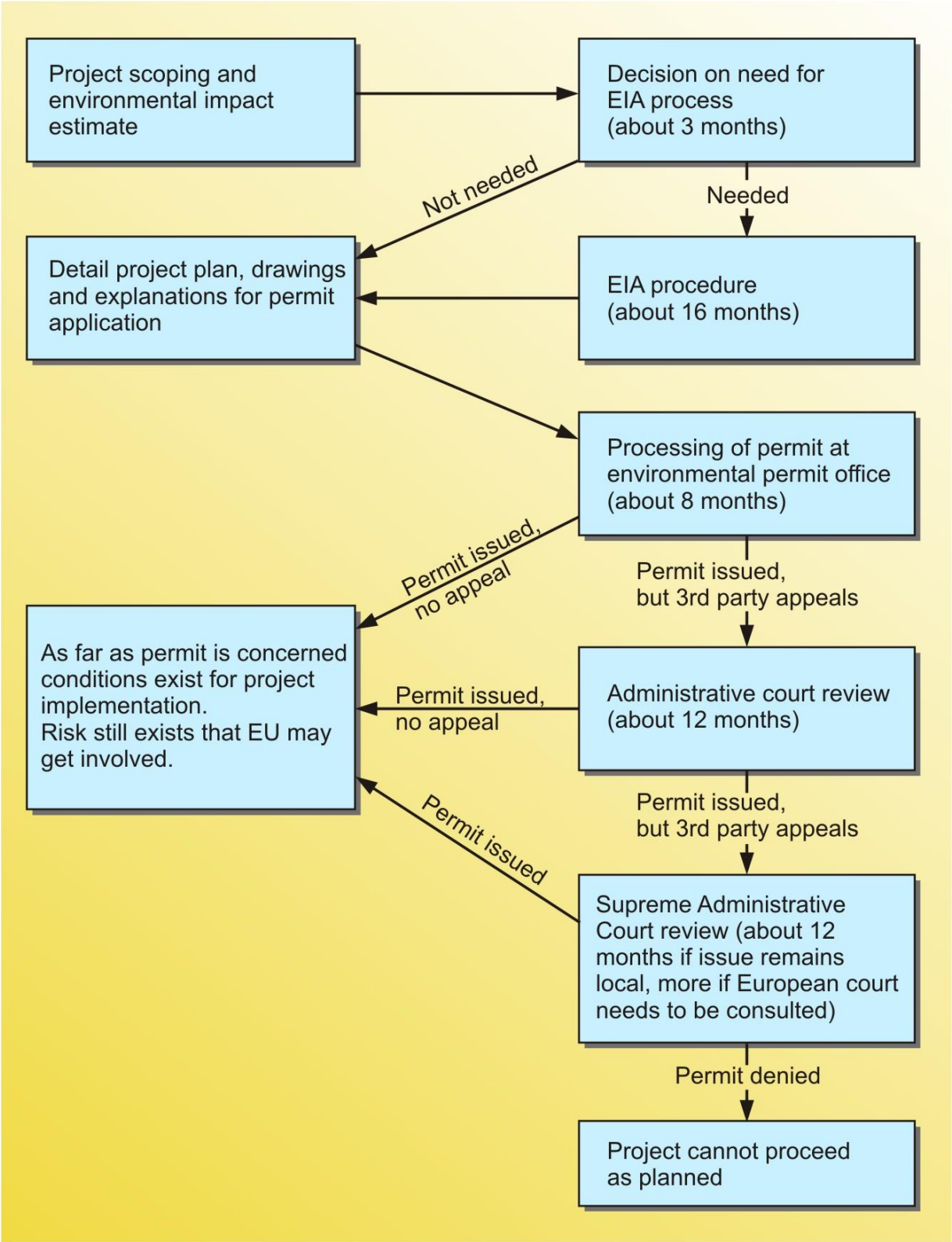


Figure 4.4. Schematic flowchart of environmental permitting process from the permit applicant's perspective.

The most obvious problems with implementing legislative intent are seen with infrastructure projects. While the goal of EU membership was harmonization of legislative structures, new legislation has often simply been superimposed over existing legislation.

Officials and average people have managed to apply convenient interpretations that reflect their own interests, aggressions and attitudes to a massive body of contradictory and ambiguous environmental legislation and standards. Thus, reasons can always be found to block, or at least delay construction of new communities, roads, power lines, municipal infrastructure and other projects. Implementation of the Vuosaari harbor project, for example, which only affected an area of a few square kilometers, required over 20 environmental permits – all appealable.

There are physical and environmental factors that set economic restrictions on land use. Then we have existing communities and infrastructure that can't be easily removed. Zoning restricts land use even further. Now, however, we are also required to take into account a large number of plant and animal species classified as endangered, as well as natural habitats, harmful substances, cultural values and environments, landscapes, etc.

For example, there are roughly 300,000 flying squirrels living in Finland, all enjoying strict protection under the Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora. All are formidable obstacles for land use. This and other similar cases mean that now we have a proliferation of restrictions and disputes over land use as noted in Figure 4.5.

If, for example, a certain non-vertebrate species in Finland for some reason goes into decline, it may make it impossible for an active project to proceed. If a species is increasing, it can still be classified as threatened and thus a problem. As conditions change and territories shift, new problems with interpretation of the law and statutes arise and new problems are discovered.

Many environmental bureaucrats entertain the notion of a perfect plan. Such a plan will be found when all those involved are included in the planning process and well thought-out interpretations are applied. Such plans will be so good and error-free that nobody will have to file complaints. In such illusions, resources are unlimited and there are no conflicts of interest.

People, who have never seen a concrete project planned through in their lives, let alone managed projects, nevertheless talk about good planning. Their own attempts, unfortunately, have been completely failed projects such as the dredging of Lake Gallträsk or dealing with the Kymijoki dioxin problems.

To secure biodiversity, Finland has joined in the EU Natura 2000 program. Construction projects affect a marginally tiny part of Finland's overall land area. The effect of construction on our national eco-balance or biodiversity is negligible. What is lost in the urban areas of southern Finland is recovered through depopulation of the countryside with fields left fallow.

How on earth have the Finns and the Europeans managed to cultivate the land, built the cities, develop the infrastructure and industrialize in a massive scale without ecocatastrophe, when a tiny change is now so difficult? From the psychological standpoint the new focus on details and formalities in environmental policy is reminiscent of a compulsive neurosis.

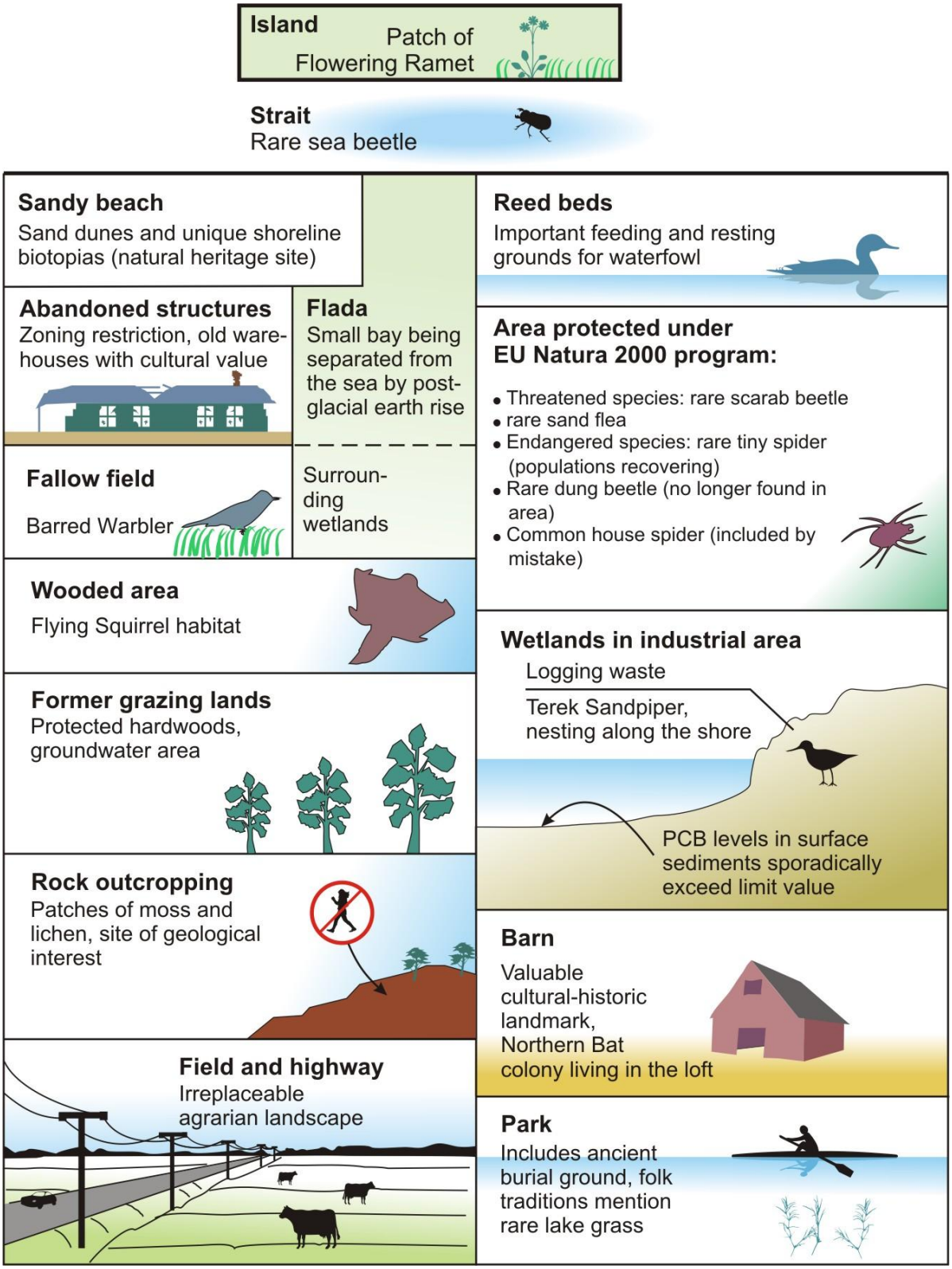


Figure 4.5. Actual examples of natural conditions used to block or slow down land use. Trying to cope with this kind of problems may cost millions, or even tens of millions of euros.

The threat of environmental administration to Finnish society

Problems with sector administration plague to some degree all societies. The question here is why specifically the environmental administration has got so badly out of hand in Finland at the moment?

It is first important to consider from where it takes its political direction. At the national level, the environmental administration has been in Green hands for nearly a decade. The environment minister is in a key position to direct of environmental policy and to choose the ones who implement it. The minister's actions influence the administrative culture and the working environment. There certainly has been charismatic leadership /23/.

While the political leadership in the environmental ministry has changed with a new coalition governments, the minister of environment is still expected to act unilaterally to the same monochromatic line on environmental issues as previous ministers. This tendency is reinforced by an administration dominated by greenish bureaucrats.

At the same time, powerful Scandinavian politicians have served as EU environmental commissioners. They have sought to build their own political monuments to EU legislation based on the ecologically weighted ideology of sustainable development. This situation has exponentially increased the amount of EU environmental legislation. The quantity of EU environmental legislation increased about ten-fold over ten years, reaching around 600 pieces of legislation in 2003 /61/.

The term "civil servant" is used in English as a synonym for public official. In Finnish government, however, we find examples of officials more interested in pursuing the political agenda of a small group than the citizenry for whom they should be working. Perhaps this bureaucratic tradition has been long tolerated due to a belief that the pursuit of different political agendas would eventually balance out.

From a rational perspective, the smuggling of the flying squirrel into the EU habitat directive seems like a premeditated sabotage to promote a narrow goal of the bureaucracy and the environmental movement at the expense of the Finnish people. The designating of some areas with no exceptional environmental values to the Natura 2000 network when they had already been planned for infrastructure development or for production facilities seems like a deliberate move to block these projects. The most notable cases are connected to the Vuosaari harbor project and Vuotos hydropower project but there are more.

Finland's accession to the EU involved a massive effort to harmonize existing legislation. Individual bureaucrats and researchers at the central administration and at regional environmental centers had to face unreasonably demanding tasks with virtually no experience. The environmental administration faced simultaneously strong internal greenish pressures and external pressures, in particular, from the scientific community, non governmental organizations, and other interest groups all wanting to implement their own agendas through the administration. The political situation, the legislative tumult and the fact that issues were being handled at such abstract levels, created the perfect storm for political and bureaucratic opportunists.

Many in the environmental administration were caught up in power struggle with the green network and its policies. Those who thought matters through themselves and made independent decisions fared poorly. When pressure is high, people are inexperienced and the working environment is dominated by a certain set of views, so the staff learns quickly to keep their heads down and stick to the official script.

When political and bureaucratic objectives crushed rational thinking and working environment became oppressive for some of the staff, security was sought from higher authorities, regulations, collective decision-making, internal administrative guidelines, and politically correct statements. The interpretations within the environmental administration were magnified through declarations and statements of principle. These declarations and principles were mainly creations of the EU bureaucratic elite. Rather than admit uncertainty, the environmental administration adopted a tone of dogmatic certainty and an urgency to take comprehensive control.

The field of environmental administration now faces a powerful contradiction. On one hand, there is the illusion of operational bliss and regulatory infallibility. On the other hand, there is the collapse of values and common sense. As a result, the environmental administration now focuses with furrowed brow on such questions as whether tar stumps constitute hazardous waste or aquatic vegetation is suitable for landfills if the bottom sediment contained slightly elevated heavy metal levels.

Part of the problem lies in international cooperation. Environmental politicians, the higher officials in the environmental administration, and the so called environmental experts exchange ideas and develop action programs in international forums in an introspective and abstract atmosphere. Many find such activity refreshing. One can embrace global environmental problems and partake of the environmental missionary work so dear to some members of Finnish society. Politically correct principles and strategies can be developed even by those with the thinnest expertise and experience, as there is no accountability for how their ideas are applied.

For example, Finland and the other Nordic countries managed to push a ten-year framework program for changing production and consumer behavior included in the final communiqué of the World Summit on Sustainable Development: Johannesburg Conference. Now the EU is adopting framework legislation on the matter, and, on the basis of its proposal, the Finnish government has named a committee to work on this magnificent program. What remains unclear is in what matters the limit will be reached in Finland or Europe within the next thousand years.

This, however, is not a case of a benign government or an administrative devotional exercise. Finland is not satisfied with defining its positions concretely on the most significant and pressing environmental problems and solving them at home. The environmental administration is promoting at international forums its own idealistic social experiment, for which it offers Finland to be the guinea pig. When eco-ideology is implemented by force and without basis, the notion of sustainable development becomes ridiculous and turns against itself.

The eco-weighted interpretation of sustainable development has reached similar proportions in the environmental administration as the information technology bubble did on the stock market a few years ago. When the IT bubble popped, market forces separated the chaff from

the wheat and people wised up to the hype. Unfortunately there is no comparable force that could separate the chaff from the wheat and bring back common sense in the environmental administration.

Over-regulation of dredging activities, the classification of rock chips and smelter slag as waste, the unrealistic setting of limits on harmful substances, unreasonable measures to protect natural areas and other unjustified acts by the environmental administration have been mentioned above. The environmental administration, however, declines to respond to these observations, even when confronted directly. This due to several factors:

- The Finnish mass media based in Helsinki have uncritically adopted the marketing material of the environmental administration. As a result, the actions of the environmental administration are still seen as positive by many groups in our society.
- Under the unwritten rules governing behavior of state officials, other administrative areas have been unwilling question the principles of environmental policy or the methods of the environmental administration, even when the outcomes are clearly in conflict with their own agendas.
- Reversing course and overturning decisions would mean a loss of face which is very hard for a bureaucracy working under the illusion of superior expertise and moral excellence.
- The dismantling of burdensome layers of redundant legislation and overly heavy standards is hard work for anyone and overwhelming for those bureaucrats who should correct their own mistakes.
- The fear of making mistakes applies to all change processes, and particularly deregulation.
- Insecurity is often reflected as a need to control.
- The environmental administrator seeks to deal with his anguish by calling for more guidelines, standards and regulations, while belief in common sense has been suppressed.
- Sector administration has a tendency to try to construct perfect systems from its own perspective.
- It is easy to hide behind collective decision-making and let the weakest link decide.
- Expensive mistakes that are the result of political administration failures are never analyzed. Instead, state resources are used to cover up mistakes, rather than to help the organization learn and develop.

The environmental administration employs also many fine and reasonable people. The main problem is in the administrative culture and values. The bureaucratic infatuation with ideological structures and miniscule problems is turning a constellation of public institutions into generators of social injustice and economic chaos.

All this is still insufficient to explain how environmental administration in a Nordic democracy has itself become a threat to the sustainable development of society. We must still deal with one more sociological process. That is the process of power itself.

5. THE STRUGGLE FOR POWER

Power has always been problematic for mankind. The exercise of power is an essential part of a functioning, organized society, but it is also legend for its ability to corrupt. Power is sweet. The thirst for power easily leads to the exercise of power for its own sake.

The power of Finland's environmental sector has increased tremendously over the last one and a half decades. This trend has been supported by Finland's accession to the European Union, the urbanization of population, robust economic growth that has created a sense of economic security, and the ideology of sustainable development. The grab for control of administrative space is similar to the territorial expansions of the 19th century, laying the foundation for rapid instating of power structures and subjugating the native people.

As a result of this development, people, land owners, municipalities, firms and other productive organizations have seen their own rights curtailed. They have been, for example, forced to cede much of the power to decide on their own affairs in their land to the environmental bureaucracy. The biggest losers have been those who are trying to build a future for themselves and others through new productive activity.

The calculations and conclusions in earlier chapters suggest that the basis for imposing the wide range of harsh environmental protection measures in Finland is unsubstantial.

This chapter considers the hypothesis that much of Finland's and EU's environmental policy is really not about serving the common good. Rather it is about the struggle for power and resources with little respect to justice, moderation or rational solutions.

Environmental power strategy and the "unknown threat"

German sociologist and political thinker Max Weber defined power as the possibility of imposing one's will upon the behavior of other people /77/. Under the Weberian view, mankind is caught up in an eternal struggle for power.

The basic configurations of the struggle for power and the use of power are ancient. Early scholars of power include Plato /48/ and Machiavelli /33/. Mao Zedung observed that power grows out of the barrel of a gun.

The economist John Kenneth Galbraith /17/ has pointed out that a modern state bureaucracy has a tendency to make the state an instrument of its own purposes. Power of a government organization can be increased through the use of e.g. the media, the legislative drafting process, and alliances.

Finland's environmental power cluster includes:

- The European Commission's Directorate General (DG) for the Environment;
- Finland's Ministry of the Environment;
- Politicians focused on environmental matters;
- Regional environmental centers and municipal environmental administrations;
- Scientific and expert organizations working with environmental issues;
- Non-governmental environmental organizations and political movements;
- Companies producing "environmentally friendly" products or related services.

Many believe that these organizations promote environmental issues to benefit society. They emphasize the importance of environmental issues and support the existing power structure that in return legitimizes their existence and confers credibility and resources upon them.

Emotionally charged slogans are very beneficial in the build-up of power. “Dark forces”, “the flames of hell”, “the Jewish Conspiracy”, “class enemy” and “the Evil Empire” are historical examples. Variations on the “unknown threat!” meme combined with “the principles of sustainable development” have become a core message of the environmental power cluster. It resonates extremely well in the politically correct Finnish nationwide media based in Helsinki.

Case: Risks to drinking water supplies

A recent study commissioned by Helsinki’s water company, Pääkaupunkiseudun Vesi Oy, from the Finnish Environmental Institute examined the water quality risks associated with bringing water to the capital through the 120 km Päijänne aqueduct tunnel. The Finnish Environmental Institute had identified 101 risks to water quality. The arranged press conference was well-covered by the media. To back up the risk, the news anchor on Finland’s commercial television channel, MTV3, shuddered, made a face, and silently let her viewers “decide.”

What emotional messages were contained in the news coverage?

- “Unknown threat!” risking the well being of people living in the Helsinki area;
- Officials at the Finnish Environmental Institute are all over the matter;
- Officials at the Finnish Environmental Institute are fighting the bad, but unspecified, polluters and industrial operators.

When the water company commissioned the study, it apparently was seeking answers to the following sorts of questions:

- What substances in which quantities have percolated or could percolate into the ground?
- What are the levels of hazardous substances seeping into the Päijänne aqueduct tunnel?
- What are the levels of substances in the water when it reaches the water treatment plant?
- What happens in the laboratories and at the water treatment plant?
- Are there any substantial risks to drinking water quality, and, if so, how large are these risks and what is their nature?
- Is there a need for further risk management measures?

Answering the question about the scale of potential risks is easy. Consider a scenario in which solvents enter into the groundwater. The harmful substance content in the groundwater surrounding some wells exceeds the guideline value for drinking water by a factor of ten. If such water enters the tunnel at 3 liters a second, and the water in the tunnel flows at a rate of 3,000 l/s, the harmful substance content is one-hundredth of the guideline value even before it reaches the treatment plant.

The study commissioned by the water company is a standard part of normal organizational risk management. It was ordered from the Finnish Environment Institute in part because of the quasi-official status the environmental protection decree had given the institute.

Finding out what is behind these threats or their actual magnitude is of little interest to the environmental power cluster or the media. Slogans can lose their sting and issues their allure when the threat is quantified. Indeed, the deconstruction of threats works to reduce the environmental cluster's power and rattles their structures. It also reduces the credibility of the media that has a tendency to distort the threats for commercial reasons.

The environmental cluster use of the unknown threat and sustainable development themes can be seen in a press release on the environmental administration's guideline on dredging activities. In it environment minister Enestam notes, "From the environmental standpoint, the guideline looks to sustainable methods, because we have no other options."

Apparently, the environment minister was taking the view that sustainable development was somehow threatened by TBT that is no longer used and is disappearing from the environment through break-down. For some reason, the threat is acute in the specific case when a negligible amount of TBT is in dredged mass being moved from one point in the sea to another. What could be behind this apparent insanity?

Power theory makes such odd remarks clearly understandable. When guideline interpretation ignores the actual scale of an environmental impact and the limit values are to some degree exceeded everywhere within human touch, the environmental administration generates power capital. The minister can then use this capital in struggles over important party issues by deciding which industrial jobs have priority. The environmental administration and its research institutes can use such capital to subdue other organizations and to force them to finance environmental research and other activities.

Classic power theory says that power should be directed at the opponent's most vulnerable spot. A fifth of Finland's foreign trade will eventually pass through the Vuosaari harbor. Helsinki submitted to the unreasonable sediment handling rules, because the environmental administration had the power to sink the project into legal disputes through never-ending permitting rounds. The environmental administration's power position was further strengthened by the fact that by killing the project it would also have sunk the City of Helsinki's plans to renew the city layout.

In 2005, the Finnish state budgeted about €250 million to the Ministry of the Environment (excluding payment of housing supports). The total budget that year was about €38 billion, i.e. less than 1% of state spending went to administration and dealing with environmental matters. This share of funding reflects the actual spending priorities of Finnish society.

In practice, however, the influence of the environmental administration far outweighs its budget. Underlying this appears to be an excellent strategy in which environmental matters are promoted at the expense of others. The environmental administration is focused on the build-up and exercise of power.

According a survey by The Association of Finnish Local and Regional authorities and Statistics Finland, municipalities and industry spend about €1 billion a year on environmental protection. The costs to individuals, small businesses, companies owned by municipalities and state industrial organizations are not included in this figure. Nor are the indirect costs related to zoning and land planning, and measures to protect the habitat. For example, environmental issues that prevent or complicate the construction of new electricity production facilities or transmission capacity are reflected directly in the cost of electricity.

The instruments and sources of power

At the core of the environmental power cluster, we find the EU Commission's Directorate General for the Environment and the Finnish Ministry of the Environment. This core has, in accordance to Galbraith's power theory /17/, all the instruments of exercising power i.e. condign power (stick), compensatory power (carrot), and conditioned power (possibility to change beliefs).

The condign power of the environmental administration, like the muzzle of Mao's proverbial rifle, is based on the new environmental standards and vastly expanded discretion. It grants the administration the possibility to destroy someone's business or source of employment and impose heavy economic burdens on others. This instrument of power is continuously expanded by exploiting the sustainable development ideology.

At the same time a carrot is offered. By subduing to the bureaucratic power of the environmental administration a permit is granted. The excellence of the environmental administration gets the high praise. By admitting our sins and paying an indulgence, our salvation is assured and we can again feel good about ourselves.

The conditioned power of the environmental administration is amplified by its alliance with the environmental science community and with the Helsinki based nationwide media. The environmental science community, by pushing its own interests provides credibility for the administration's agenda. The Helsinki based media gets fascinating stories that paint havoc and deliver guilt providing the media itself the role of public savior.

The core of the environmental power cluster also has all Galbraith's sources of power i.e. personality, property, and organization.

Finland's most recent environmental ministers and many of those holding top posts in the environmental administration learned about the struggle for power and methods of manipulation as student activists in the 1970s. There certainly has been charismatic leadership.

The budget of the environmental administration is limited. However, when combined with other sources of funds and when focused to build-up and exercise of power instead of investing in the environment, these funds easily exceed anything that the subordinates of the bureaucracy have available to defend their rights.

The present broad use of power by the environmental cluster would not be possible without an internally disciplined organization. The EU Commission is well recognized as an authoritarian, disciplined organization that dismisses those insiders who criticize.

Some people in the Finnish environmental administration may be even politically incorrect in their thinking on environmental issues and administrative methods. Nevertheless, the organization submits them to pursuit of a single-minded agenda based on the conveniently interpreted sustainable development ideology. The means of bending bureaucrats to a certain mindset and the throttling of diverging opinions are well known. These organizational control techniques range from delivering public praise, promotions and challenging tasks to

marginalizing the trouble-maker, excluding the person out of collegial activity and humiliating an individual publicly.

At the core of Finland's community of scientists and experts working with environmental issues is the Finnish Environment Institute, a central actor in the development of environmental standards that is totally dependent on Ministry of the Environment for funding. Given such an arrangement, it is natural its research results and expert opinions tend to support the official policy.

From the view of the Ministry of the Environment, it is natural to procure the monitoring of the functioning of the environmental permitting process without competitive bidding from the Finnish Environment Institute. This is tantamount to putting the goat in charge of the cabbage patch.

The strength of the power arrangement between the environmental administration, public environmental expert organizations and the media is illustrated by the handling of the tributyltin-issue in connection of dredging. In spite years of extensive coverage of this issue in Helsingin Sanomat and nationwide television with a number of politicians, bureaucrats and so called "environmental experts" all expressing their horror, ordinary citizens did not receive information on the scale of the problem.

Finally after five years of bombardment with one sided information the common man received information on the scale of the problem from a nationwide television program 18.2.2008.

Indeed the TBT-problem was miniscule in connection of dredging. The health hazard had been vastly exaggerated. Those considering productive investments in Finland were at the mercy of the environmental administration. The common man had been fooled. The credibility of the environmental bureaucracy and Helsingin Sanomat was shaken.

Helsingin Sanomat and the environmental administration struck back with articles painting the horrors of TBT over a full page in the Sanomat Science & Nature section. The cornerstone of the page was a graph showing the mortality of mussels as a function TBT-content of sediment in a so called aquarium test.

This graph was a product of a several steps of manipulation shown in Figure 5.1.

Changing perspective started long ago in the environmental administration and Helsingin Sanomat with the notion that since the impacts of dredging are minor one should focus on the impacts of TBT instead. It is just mentioned that TBT is released into the water mass during dredging and dumping. The questions of how much is released and weather this has any significance are conveniently avoided.

Next step was a test. The environmental administration decided to study mussels that are known to be vulnerable. It chose to procure the testing from a reliable source, from the researchers of the Southwestern Finland Environment Centre and the University of Turku, who had already made their opinions known.

It is also known that mixing of TBT directly with sediments and using a small amount of standing water exaggerates mortality. This is due to the fact that TBT forms a strong bond

with a suspended particle after leaving the ship bow. This reduces its bioactivity. In nature there is also a huge amount of clean water floating around with currents and flushing the sediment surface. Whether the mistake in test arrangement was intentional or lack of professional skill is not known.

The initial results published in a professional journal (step 3) showed that TBT had no effect on the mortality of mussels in the test at concentrations that have practical significance in Finland.

For some reason the results were changed (step 4). One can only speculate that since the initial results did not support the actions of the environmental administration, there was a need to take a closer look. In any case even these changed results do not show that TBT in dredging mass would have any practical significance on mussel mortality.

The final fifth step in this chain of manipulation was taken by Helsingin Sanomat. The paper removed the results showing mussel mortality in clean sediment from the chart. This face saving forgery produced a chart indicating that TBT causes mussel mortality even in small concentrations.

There is another perspective to this issue. When this text is written, the Finnish shipyard industry is fighting for its life. It also has to do once again channel dredging in order to float world class cruise vessels to a customer. There is a small amount of TBT in the mass to be dredged. Conventional dredging project would release perhaps 0.1 kg TBT in the water mass (half a days release from an ocean liner of the 1990's). The environmental administration has disputed the permit. It is pushing the shipyard towards an unspecified solution that could delay the delivery and cost 10 million euros or more.

Now let us for a change make the assumption that this dredging operation would have some impact on the mussel population. You have the choice of 5 hectares of dumping area without mussels or 5000 shipyard workers without jobs. Which would you have?

The Danish sociologist Bengt Flyvbjerg /16/ proposes four central theses on the relationship of power and rationality:

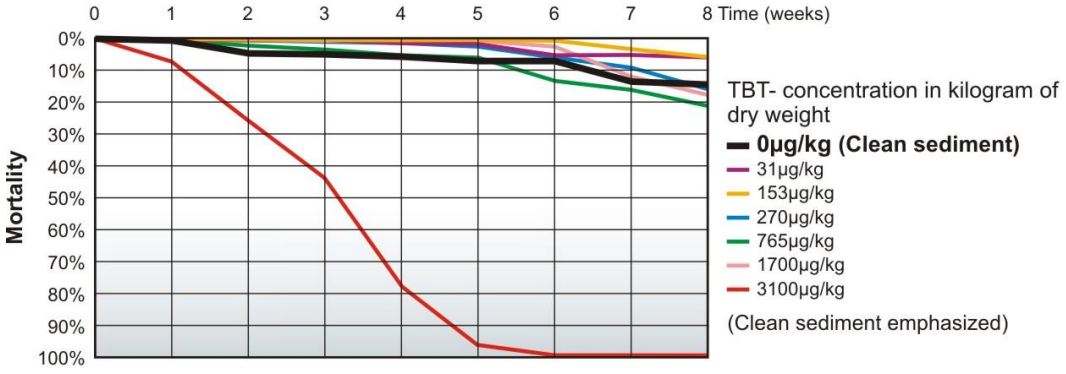
- Power defines reality;
- Rationality is context-dependent; the context of rationality is power; and power blurs the dividing line between rationality and rationalization;
- Rationalization presented as rationality is a principal strategy in the exercise of power;
- The greater the power, the less the rationality.

The theses are appropriate in the case of European environmental policy generally and in the Finnish TBT case specifically. When public administration expert institutes rationalize political objectives and administrative decisions, they are not just pursuing their own interests. They become propaganda departments for the state bureaucracy.

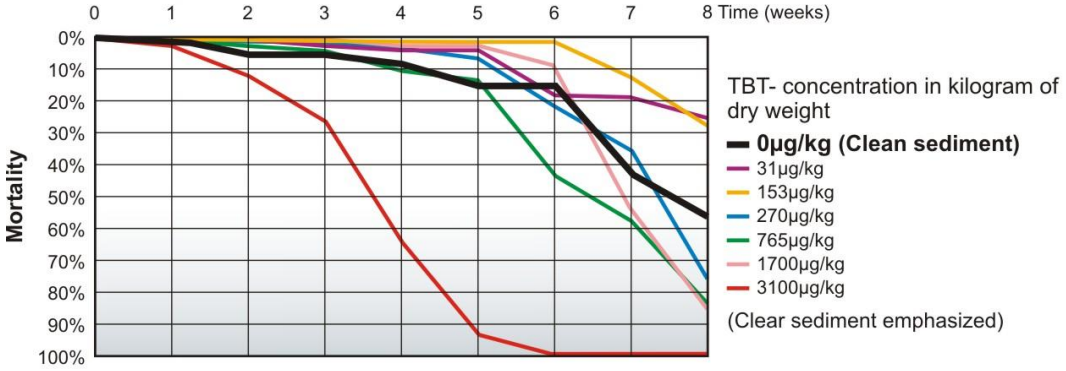
1. **Sleight of hand trick:** Change of perspective from impacts of dredging to impacts of tributyltin (TBT).

2. **Tendency:** Choice of sensitive mussel as research object, procurement of research from a reliable source and choice of method known to exaggerate the impact.

3. **Original results:** Finnish journal for professionals in the water sector 4/2006, TBT has no impact on mussel mortality at concentrations found in Finnish surface sediments.



4. **Changed results:** Chart send to Helsingin Sanomat. Mortality increased but TBT in dredging mass has no particular effect on mussel mortality.



5. **Scientific forgery:** Chart published by Helsingin Sanomat, mortality curve in clean sediment has been removed. TBT appears to increase mortality even at low concentrations.

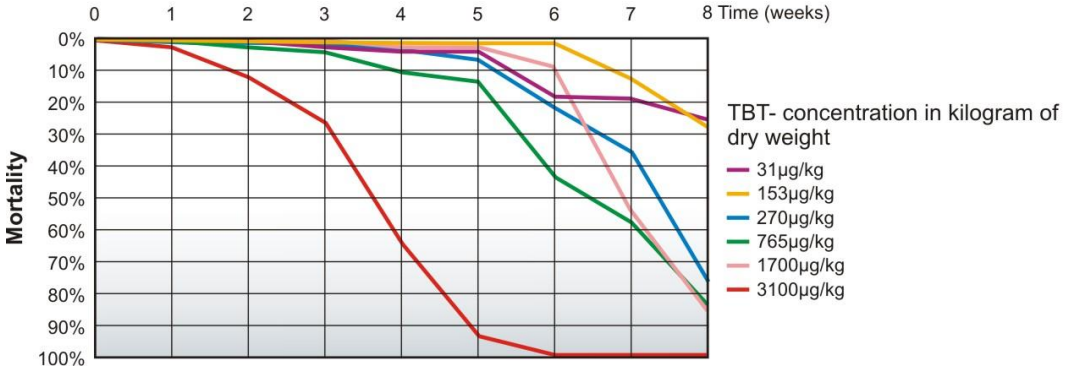


Figure 5.1 Steps of manipulation aimed at restoring the credibility of the environmental administration and Helsingin Sanomat in their handling of dredging projects with a TBT-issue.

The sustainable development ideology as a tool for amassing power

Finns have embarked on making sustainable development an ideology and the European Union is following. When an ideology becomes an instrument of power, it has a tendency to turn against itself.

According to the Finnish National Commission on Sustainable Development, sustainable development is globally, regionally and locally occurring continuous and guided by change of the society. Its goal is to secure for current and future generations the possibilities for a decent quality of life.

The goal is of course, with merit, but far from new. Power enters the scene with the words "guided change of the society". Those familiar with George Orwell's work might ask, who guides such change and on what basis.

Officially, sustainable development policy should be evenly balanced across the ecological, social and economic domains. This balance was accepted in Finland without asking if there were any environmental problems similar in scale to the country's social and economic challenges. Even today, it remains unclear what environmental issues, besides climate change, threaten the possibility for a decent quality of life for current and future generations in Finland.

The latest litany from the environmental administration starts with development that is ecologically sustainable, socially just and mentally renewing. The weighting on ecologically sustainable development is further emphasized by simultaneously bringing up two abstractions in place of economic and social dimensions.

The ecological dimension of sustainable development starts with the assumption that mankind is currently over-consuming its natural capital. This trend must be radically reversed in production and consumption in order to leave to future generations at least the same possibilities we have had. It has become fashionable to speak of the ecological efficiency of production, dematerialization, the de-linking of natural resource consumption from economic growth, and the role of the environmental administration in a coming structural transition that no one has bothered to concretely describe.

The notion of "securing the living conditions for current and future generations" is easy to accept and support. The world has plenty of growing environmental problems, such as diminishing fresh water supplies, illegal fishing, and pollution. Of course, unbridled consumption of limited resources makes no sense at all, and, indeed, many areas are rapidly approaching the point where population growth is unsustainable no matter what we do in Europe and Finland. If nothing else, nature's own processes will in the end deal with the situation.

We are routinely posed the terrifying thought of what might happen if 1.3 billion Chinese aspired to a standard of living on a par with the Europeans. This marketing theme for the sustainable development ideology is simultaneously both threatening and makes one feel guilty. We are unable to deal with the issue and to see how we are manipulated. Terrorized, we swallow the entire eco-ideology.

In response, it should be noted that the land surface of China is 9.6 million km^2 and the population is 1.3 billion. The land area of Germany is 360,000 km^2 and the population is 82 million. While China has large deserts in its western provinces, the population density is only 135 persons/km^2, or about half of Germany's 228 persons/km^2.

In China, the fertility rate has fallen as part of national family planning policies. Both countries will be facing declining populations. Why exactly shouldn't the Chinese, following rational policies and improved technology, eventually achieve for themselves a similar standard of living as the Germans have?

The eco-ideology has been sold with effective marketing techniques. We are presented with manipulative arguments, threatened and made to feel guilty. Eco-ideology calls on us to reduce material consumption to a tenth of present levels and to readjust our lives so that the world can be saved. Yet, excluding our reliance on fossil fuels, at least we Finns already live materially on a sustainable basis in our own country.

The logic of such apparently unreasonable demand is that, with the ideology, the use of power can be extended far more broadly than is justified on the merits. Eco-ideology blurs the boundaries between important and trivial matters. It also blurs the line between problems of others and those of our own.

There is no longer need to specify facts, quantify or prioritize problems. We move straight from the abstract litany to exercise of power as if natural capital were being over-exploited everywhere all the time.

In the autumn of 2005, environment minister Jan-Erik Enestam led a ministry campaign to make mothers and incontinent seniors feel guilty about the use of disposable diapers. It was claimed that disposable diapers violated the principles of sustainable development. The notion that diapers and menstrual pads were filling Finnish landfills was intolerable to the minister.

An assessment of the environmental impacts of traditional and disposable diapers is presented in Appendix 6. From an environmental standpoint, it makes almost no difference if one uses disposable or reusable diapers, which require energy for washing and generate waste water. Dumping diapers in a landfill is a minor part of Finland's miniscule landfill issue. Moreover, disposable diapers can be burned for energy or composted.

The Ministry of the Environment has thus sought to make mothers with small children and octogenarians feel guilty about the condition of the environment with almost no legitimate grounds. It has ignored entirely serious issues related to hygiene and infection risk. No weight has been given to the convenience that might help the mother preserve her energy for taking care of the child or the strength of a family member or a nurse taking care of a bed-ridden loved one.

Through its campaign, the Ministry of the Environment succeeded in killing two flies with a single swat. It managed to make two already suggestible segments of the population feel guilty and it succeeded in diverting attention from failures of European and national waste management policies. Indeed, the emissions generated by a bureaucrat flying the distance between Brussels and Helsinki create an environmental problem similar in magnitude to a person's diaper use throughout the lifetime.

The situation in Finland is nothing new. In the dark days of Finlandization just a few decades ago the official foreign policy was used as an instrument of power in the domestic policy. Politicians played the Moscow card to promote their agendas and to hit opponents. The Helsinki based power media preached the wisdom of official policy and routinely suppressed critical views. Minister Eino Uusitalo proposed the teaching of the Finnish-Soviet Friendship, Cooperation and Mutual Assistance Treaty in schools.

Subsequently, many people publicly admitted that the chill of Finlandization had caused many politicians, bureaucrats and editors alike to turn their backs on the interests of the people and democracy in their pursue of own interests.

Now sustainable development has become an instrument of power. The EU Commission card has been played successfully against local populations and energy companies (e.g. the designation of the Lake Kemi marshes in the Natura 2000 program to block the Vuotos hydropower project) as well as in unsuccessful attempts block the Vuosaari harbor project. There is also a growing threat that discretion will be used against those who question the practices, actions and justifications of the environmental administration. Views critical to the sustainable development ideology are suppressed at the Helsinki based mass media.

Ecologically weighted sustainable development ideology is even taught in Finnish schools. Children are made to feel guilty and the formation of individual opinions based on one's own analysis of problems is discouraged through deliberate examples.

The Stalinists headed the democratic front in Finnish student politics during the Finlandization period preaching the virtues of their scientific world view. Were they seeking democracy or power? Is history repeating itself?

The pyramid of power

Martti Koskenniemi, professor of international law at the University of Helsinki has focused on fragmentation /37/. He says that international law systematically recognizes different legal standards for different branches. These standards evolve at their own speed and are sometimes contradictory. The state is no longer a single entity capable of having its own opinion under this view. Now sector officials represent interests for their specific branches internationally, and do not put issues in any order of importance. Koskenniemi uses the contradiction of environmental and economic legislation as an example.

Finland has established an extensive network of protected natural areas. To protect biodiversity it has also granted threatened or endangered status to certain plants and animals. The latest appendix of the nature protection decree lists 1,410 threatened species, of which 608 species are given endangered status. Most of the endangered species live at the extreme edges of their natural range, i.e. in areas of strong natural variation. The disappearance or appearance of many species reflects changes in farming practices.

Consider, for example, bats which are on the list of threatened species. At least six of the 11 identified bat species in Finland have established breeding populations. However, information about bat life and their range is spotty. The environmental administration experts cannot say whether the bat population is growing or declining overall, or even provide a

rough estimate of the number of bats in Finland. Nevertheless, the protection measures are justified under the EU habitat directive and the Agreement on the Conservation of European Bats to which Finland is a signatory.

To estimate the size of the bat population in Finland, we relate them first to bird populations. Bats are significantly more common than owls, but less usual than flycatchers. Using this reference, we can infer that the bat population is on the order of a million individuals.

The list of endangered species consists largely of plants and insects. Information on the species range and occurrence is often inadequate. When identified, species such as the fairy grass at Lake Matalajärvi or the beetle in the Espoonlahti Bay, as mentioned earlier, can become vehicles for interfering rather extensively with human and organizational activity.

If it had wanted, the environmental administration could have, for example, demonstrated its commitment to the protection of highly threatened sheep dung beetle *Aphodius ictericus* by financing sheep farming in Finland. Indeed, the ministry could help many threatened butterfly species merely by paying farms for practicing traditional farming methods. But why would the ministry bother? If Finland has 1,400 threatened species, there are 10,000 places of occurrence per species and influence zone is 2 hectares, the environmental administration has effectively assumed administrative control over a major portion of the country.

In a given year, less than a tenth of a percent of Finland's total land area is affected by infrastructure, municipal, and plant investment projects. When the environmental administration has arranged a number of individual species, habitats, cultural heritage sites, landscapes, geological formations, etc. as land use problems, the entire country is effectively mined as far as infrastructure and investment projects are concerned. With a single sleight of hand, much of the legal protection traditionally enjoyed by private individuals, municipalities, infrastructure developers, industrial organizations, and investors is wiped away with rationalization that has very little to do with Finland's environment.

While EU waste hierarchy and waste definition are abstract structures that cannot withstand close scrutiny, they are useful to the environmental administration denying municipalities and firms the power to decide on what is waste, how materials are treated and how much is reused or recycled.

The cost of remediation of the 20,000 areas identified by the environmental administration as contaminated land has been estimated at around €1 billion. More can be found once you start to look for it, of course. When are we dealing with a case of actual environmental threat and how big is that threat?

The build-up of Finland's modern economic structure may have locally affected the environment. Society, however, benefited from what was legal at the time in the form of jobs and prosperity. If the administration now seeks to characterize this legacy as a problem, should it not be the duty of the society to participate in cleaning up the mess?

Noise and illumination, traditionally borderline nuisances, have opened new ways to extend bureaucratic power and increase operating costs. Cities originally formed around productive activities. Now noise guidelines are sweeping natural phenomena like birdsong. Reducing "light pollution" should, according to some bureaucratic opinions, override work safety.

For agriculture and forestry, the landslide is continuing. Finland has millennia-long traditions of raising livestock with no significant negative environmental impacts. Now the environmental protection act is being extended to limit the grazing of cattle, a degrading measure for farm families. Conservation measures and new guidelines are squeezing forestry and forest industry, a major source of income especially outside cities.

Ever increasing efforts to protect buildings, cultural legacies and unique landscapes have also begun to take strange forms. Central administration bureaucrats create different site lists. A property owner and or municipality may wake up to the fact that the possibilities for managing their own property have been limited, while cost accountability has been imposed.

The renovation of Helsinki's landmark eyesore, the "Sausage Building" (*Makkaratalo*) is an example. The sausage-shaped façade on its above-ground parking structure failed get into any protection list. Yet Finland's National Board of Antiquities found it as a historical example of bad architecture. This set the framework and price of the project.

The exercise of power can also extend to the rights of the common man. Scouting and forest orienteering have a century-long tradition in Finland, yet environmental administration has succeeded in limiting unilaterally the ancient Nordic right to move freely in nature – at least in the capital region.

The development of the new situation is illustrated in Figure 5.2 showing the pyramid of power. Finnish politicians, bureaucrats and state researchers along with their Nordic colleagues first push politically correct phrases of eco-weighted sustainable development ideology into international communiqués, agreements and EU-policies. Then these structures act as a Trojan horse.

The upper level of the Finnish environmental administration interprets international agreements, theoretical principles and EU policies for its own convenience. This is reflected directly in the drafting of legislation, the development of lower-level standards and preparation of guidelines. The impact of environmental policies on the rights of others and on society in general can be ignored when matters have already been decided at the international level.

The local level in environmental administration formulates solutions to a vast range of practical matters. Many environmental officials are true believers of eco-ideology and the discretionary power it brings tantalizes them. On the other hand, only few dare to make a decision against prevailing thought or a guideline, even if the law permits it and regional benefit demands it. It is easier to be thought a fool and go along with the principle handed down from above.

Earlier, environmental matters were dealt with at three national levels and the approach was practical. Now there are five levels, and the approach is abstract, even ideological. The power cluster manipulates information and exploits game theoretical position at all levels.

Discussion of the scale of issues and the effects of decisions on society is deliberately avoided, because the use of common sense reduces the opportunities to use power.

It appears the naïve Maiden of Finland is becoming the fatted goose for the environmental power cluster. From above, politicians and bureaucrats shovel strategies, target values, and

directives down her throat. Then at a lower level matters are exaggerated, obfuscated and conveniently reframed in a new context. The fat content in the liver of the bloated goose increases. The cluster drools in enjoying the product of its actions – a ten-fold increase in its authority.

This picture is so dazzling that it is worthwhile analyzing it from another perspective.

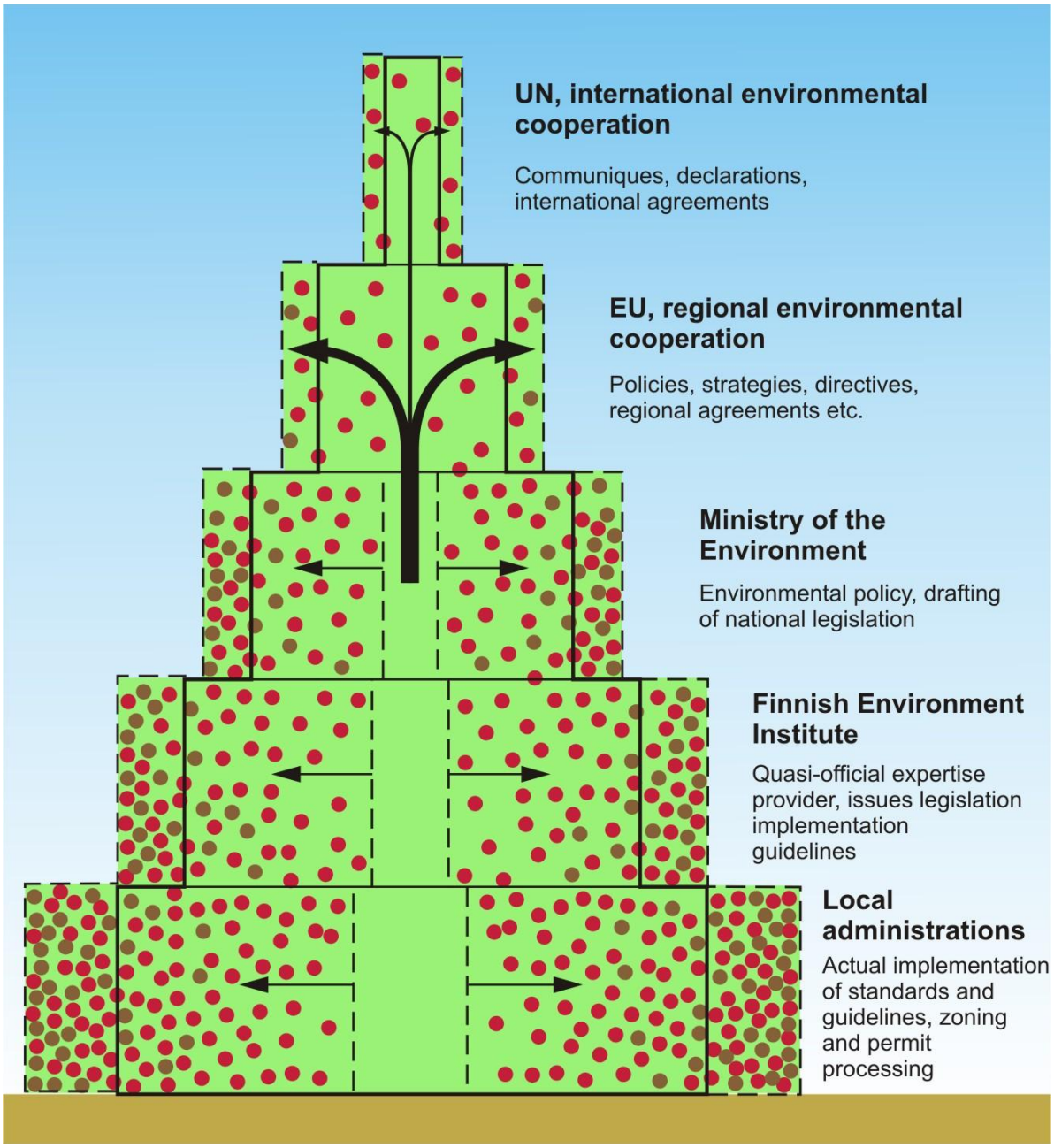


Figure 5.2. The widening pyramid of power. Administrative subordinates of the environmental bureaucracy are increasingly showered with acts of power and arbitrariness.

The vicious circle of power

It is easy to think that environmental bureaucrats are just over-enthusiastic theoreticians. Unfortunately, this is not true. Most of those working in the higher levels of the environmental administration are very talented in their own ways. They have been selected to their positions specifically for their skills in advancing the agendas of the environmental sector or certain political parties.

Figure 5.3 suggests elements that allow the environmental administration to extend its power well beyond what one would reasonably justify.

At the heart of power in Finland's environmental administration we find a disciplined organization with a dominant mind-set (eco-ideology). The environmental administration is involved with environmental policy, strategic planning, management and allocation of resources, drafting of legislation, international cooperation, permit processing and oversight of activities, research and expert work, public relations work and environmental investments.

Under the prevailing view in Finnish society, such instruments of power belong to sectoral administration. The problem is that the acceptance of this view leads to an ever-expanding vicious circle.

International environmental cooperation is manifested at conferences on important environmental problems, often of global scope, such as climate change, biodiversity, and water problems. These conferences are attended by the environmental science community and public officials. Participants at summit-level conferences also include top EU officials and national ministers.

Such get-togethers are well known for the broadly worded communiqués and declarations they generate. Agreements signed on the most important issues carry some weight of international law. These communiqués and agreements are basic elements in the EU environmental policy in addition to the sustainable development ideology, national policies, various interests, political realties, trade policies and core European gestalts.

Political constellations to deal with the environment are distorted in their work for the common good by the fact that the central players, i.e. the EU Commission's Environment directorate-general EDG, environment ministers, leading environmental politicians, senior environmental officials of different countries and their close advisers, and environmental scientists all share similar interests. Few of these people possess more than feeble personal knowledge of the true magnitude of problems or how one can concretely deal with them.

Even more importantly Europe's overall advantage occasionally seems irrelevant to European environmental policy. When the goals of competitiveness for Europe set at the Lisbon summit got out of hand, many began to realize that EU environmental policy may have something to do with it. EU officials came up with the response that competitiveness can be promoted through tough environmental policies. The EU would promote environmentally friendly innovations for e.g. renovation of concrete structures and intelligent cars, as well as phase out ecologically detrimental subsidies and paints that are not water-soluble.

Thus, the EU is focused more on the condition of the tree than the forest. Evergreen themes are linked to sustainable development, even if they have no significance in the matter. The issue of the impact of environmental policy on people's basic rights, jobs and competitiveness is avoided through politically correct phraseology.

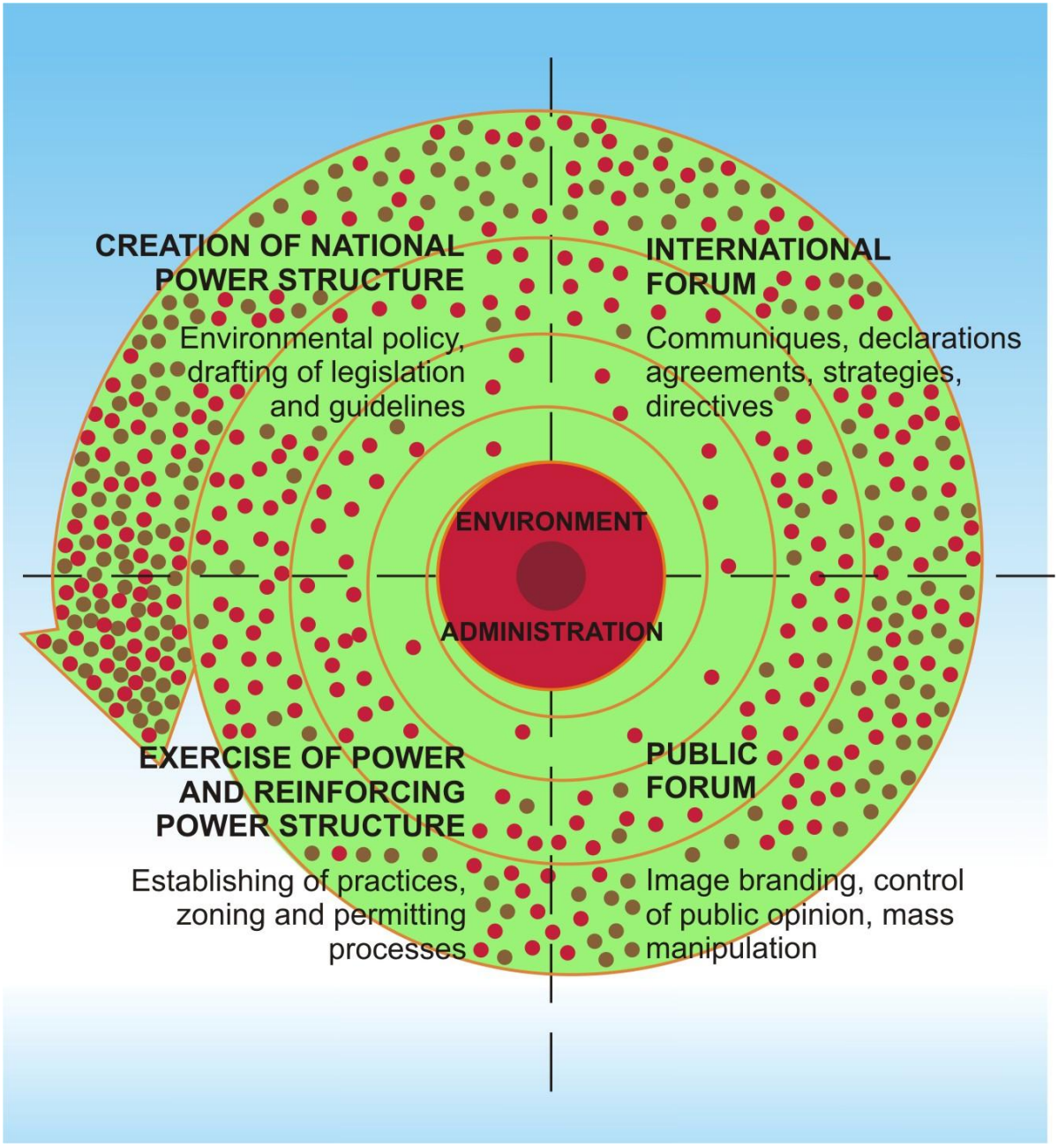


Figure 5.3. The vicious circle of eco-bureaucratic power.

The EU environmental policy process is described for example in /31 and 35/. Policy projects start from a variety of reasons including institutional pressures, international obligations, reactions to emergencies, treaty obligations, harmonizing pressures, political evolution and concrete needs of the people. Then there are strategies, programmes, declarations, white and green papers, recommendations and opinions. The policy process congeals around binding regulations, decisions and directives, i.e. legislative guidelines for member states. Finally there are implementation and court rulings that are supposed to clarify how EU laws should be implemented.

During the formation of policy, a variety of environmental policy principles mentioned in treaties can be exploited. These are not traditional justice principles but rather poorly defined statement principles that the bureaucratic elite has created and is constantly changing for its own convenience.

EU environmental policy typically obfuscates the scale of a problem, fails to demand concrete facts before taking action, and above all is overlapping and redundant. For example, integrated product policy is being pushed onto prepared criteria based on existing prohibitions and regulations without thinking through what might be important. The same goals appear in several programs and bodies of regulation rife with contradictions.

EU environmental legislation to a large extent deals with issues that are limited within the boundaries of a member country supposed to be sovereign. Waste issues provide a good example here.

Are EU politicians, officials, and judges really so enthralled with the wonderful illusion of their own overwhelming capacity for thought that they do not see that interfering with complex local issues from an ivory tower may do more harm than good? Or could it be that in their lust for power they ignore the subsidiarity principle (i.e. that decisions by public authorities be made at the level as close as possible to the people affected and that bureaucracy handles every matter at the lowest level possible).

In defense of the EU Commission's EDG, we can say that it has been under intense pressure. The environmental officials and ministers of each member state want to push their own agendas and systems as their contributions to EU policy. Environmental groups have also been active.

While the environmental ministers of "leader states" push for all kinds of legislative projects, the strategy of overlapping and contradictory environmental legislation may be something cooked up in the EDG. Such a massive and contradictory body of legislation is in itself an enormous source of power. If the subordinate does it this way or that way, it is always done the wrong way. Moreover, such a complicated body of legislation is difficult to eliminate.

The top officials in the EU Commission, off course, have been selected from the pool of masters of bureaucratic power. The commissars are among the most successful political actors in Europe.

Now the EU has started to put in place a natural resource strategy. Methods offered to fight climate change have been proposed also in this case. They include:

1) Information guidance (reporting duties, environmental systems);
2) Certification, verification and eco-labeling (image management);
3) Reduction targets (e.g. waste recycling targets);
4) Economic guidance (e.g. taxation policy);
5) Legislative guidance (e.g. standards);
6) Quotas and trading schemes (like CO_2 quotas and emission trade).

In this framework, countries and industries compete to advance their own interests. The Commission is conveniently positioned to decide who wins and who loses, taking, of course, the interests of the largest EU members into account. The Commission's power is thus increased by an order of magnitude. Member countries and their people loose power to decide how to manage their own resources.

When the waste definitions passed EU decision-making machinery, its problems instantly became power capital for the EU Commission. Under the Treaty of Rome, the Commission has the monopoly on introduction of legislative proposals. The price of fixing the definition become negotiable and now requires political horse-trading. This arrangement naturally ties up the resources and political capital of those wanting to fix the problems.

Of course, not everything makes it through the EU decision-making process. The proposals of the EDG include considerable internal and inter-directorate consultation, as well as consideration by the Council of Ministers and the European Parliament. Lobbyists examine these proposals closely to figure out how they might affect the interests of their masters. A proposal may conflict strong national interests. In the drafting of regulations, the rough edges of the content are usually smoothed away.

There is a lot of talk in EU. However, there is little substance. A proper cost benefit analysis is systematically lacking in the EU policy process.

Consider for example the EU habitat directive. How many square kilometers is this directive supposed to cover and how is it divided between different habitats, animal and plant species and sites? What is the value of the rights local people and organizations are losing as a result of this directive and how should they be compensated? Off course, it is in the interest of the European bureaucratic elite to avoid these questions.

But then the European people also finance a court called the European Court of Justice. Is it a genuine court of justice, an institution making decisions on bureaucratic disputes or a vehicle of extending EU power? If it were a genuine court of justice, why has it not ruled on how local people and organizations should be compensated for their loss of rights when the EU is reaching for the important goals mentioned in the habitat directive? In other words, should they be treated like American Indians, should they get full compensation or is justice somewhere in the middle?

The EDG has considerable resources for producing and manipulating information. Environmental groups are also valuable allies for the EDG. The inevitable differing views and clashes of interest between industrial and environmental groups on drafted legislation can be exploited by the EDG to build up its own power. When member states have

disagreements, the EDG can operate as an interlocutor, using its existing power to disciple quarrelsome member states.

The Commission slyly portrays itself as listening closely to the opinions of people and national groups. The programs and writings of Greenpeace and other environmental groups really seem to be studied carefully at the EDG. These groups, however, represent only a fraction of European people and usually those people who are least affected by the regulation. One must wonder if the views of landowners, small rural entrepreneurs, farmers, the unemployed, and those who warn of the dangers of over-regulation are also being listened to as closely.

The activity of Finnish politicians and officials in environmental issues is useful to the supranational amassing of power at the EU level in several ways:

- When these Finns push their eco-ideology and world betterment goals in EU politics, they contribute to the consolidation of EU power;
- By playing off idealists against realists or those pushing their own national interests the EU Commission can operate more efficiently from the center;
- When EU legislation is implemented the active countries naturally adopt the role of model students supporting the EU goals;
- By voluntarily submitting to the EU environmental policies, Finland becomes both a guinea pig and a country footing largest part of the bill for the construction of EU power. Making countries like Italy or France submit requires much more work and concessions from the EU. It succeeds better if the breakthrough occurs first in smaller states; and
- When Finns bring their internal disputes to be resolved by the EU, they concede to the EU more possibilities to extend its power and concede territory that rightfully should be part of the nation's internal affairs.

Building a power structure at the national level occurs largely through environmental policy and legislative work. The EU's environmental policy increasingly forms the basis for power build-up and directives are the cornerstones of legislation.

Environmental directives usually grant considerable national latitude. Some countries skillfully use this latitude to their advantage and are deliberately lax in enforcement. Compliance with the new legislation is not a priority when it creates more problems at the local level than helps.

For Finnish environmental policy, it has been a matter of honor to tighten standards beyond the minimum limits of EU directives. Those phrases and themes that Finns have been pushing at the international level are used in enforcement even before a directive has been issued. Finnish bureaucrats have also learned new ways to build and use bureaucratic power from old EU-countries like France, Germany and the Netherlands.

Appendix 7 contains the environmental policy section of prime minister Matti Vanhanen's 2003 government program. The environmental administration has been searching substance for this kind of abstract eco-programs. If substance and priorities had been considered first, implementing the program would have been easier. On the other hand the bureaucracy would have been left with lesser opportunities to build-up of power.

The working groups preparing national environmental legislation include bureaucrats from several administrative levels and lobbyists. These working groups define the central structures of legislation. The responsible ministry plays a central role, because its official both leads the group and acts as its secretary.

Most of the invited experts come from the public sector. When a member of the business community and a representative of an environmental group are included in the drafting work of environmental legislation, conflicts are inevitable. When the draft has been through the comments round more conflicts arise. Clashes of interests and the prevailing views of society make it possible for the environmental administration, like the EDG, to play sides off against each other and consolidate their own power further.

The impacts legislation on regional economies, on employment and on the rights of bureaucratic subordinates are not considered explicitly. There is a good reason for this. Explicit analysis of these issues would affect the content of the law and limit the possible scope of its interpretation.

The Finnish parliament can always revise a proposed draft. When it holds hearings, typically the same set of experts is called that provided input on the draft. The prevailing views of society influence this process. The environmental administration and the Helsinki based nationwide media play the major role in creating this view.

As the laws begin to be applied, decrees and lower-level standards are needed. The environmental administration also wants to create guidelines on how the laws should be interpreted. Again it exploits its central position and formulates practices based on its own view.

The matter is exemplified in Figure 5.4. Because there are currently no major environmental problems in Finland – with the exception of greenhouse gas emissions – the needs for much of the regulation are simply not there. Thus, the environmental administration's power really starts to grow when hard numbers and common sense are set aside. The organization concentrates on preparation of lower-level standards and guidelines based on viewpoints, ideologies, abstract EU policies and related theoretical interpretations, and playing off interest groups against each other.

Against this background, it is natural that the environmental administration wants to develop legislation on the use of natural resources based on the EU abstract litany on waste policies, sustainable use of natural resources, and sustainable consumption and production. Such legislation can be a wonderful source of power – so magnificent in fact that it would be unwise for anyone to challenge it.

But where is the problem? If concrete estimates of environmental impacts and depletion of resources were used, discretion would become more limited and the prescribed measures would have to make better sense. Moreover, if the estimates were in line with the appropriate level of protection, room for discretion would shrink further. The environmental bureaucracy would have less to bring to the fight over power and resources.

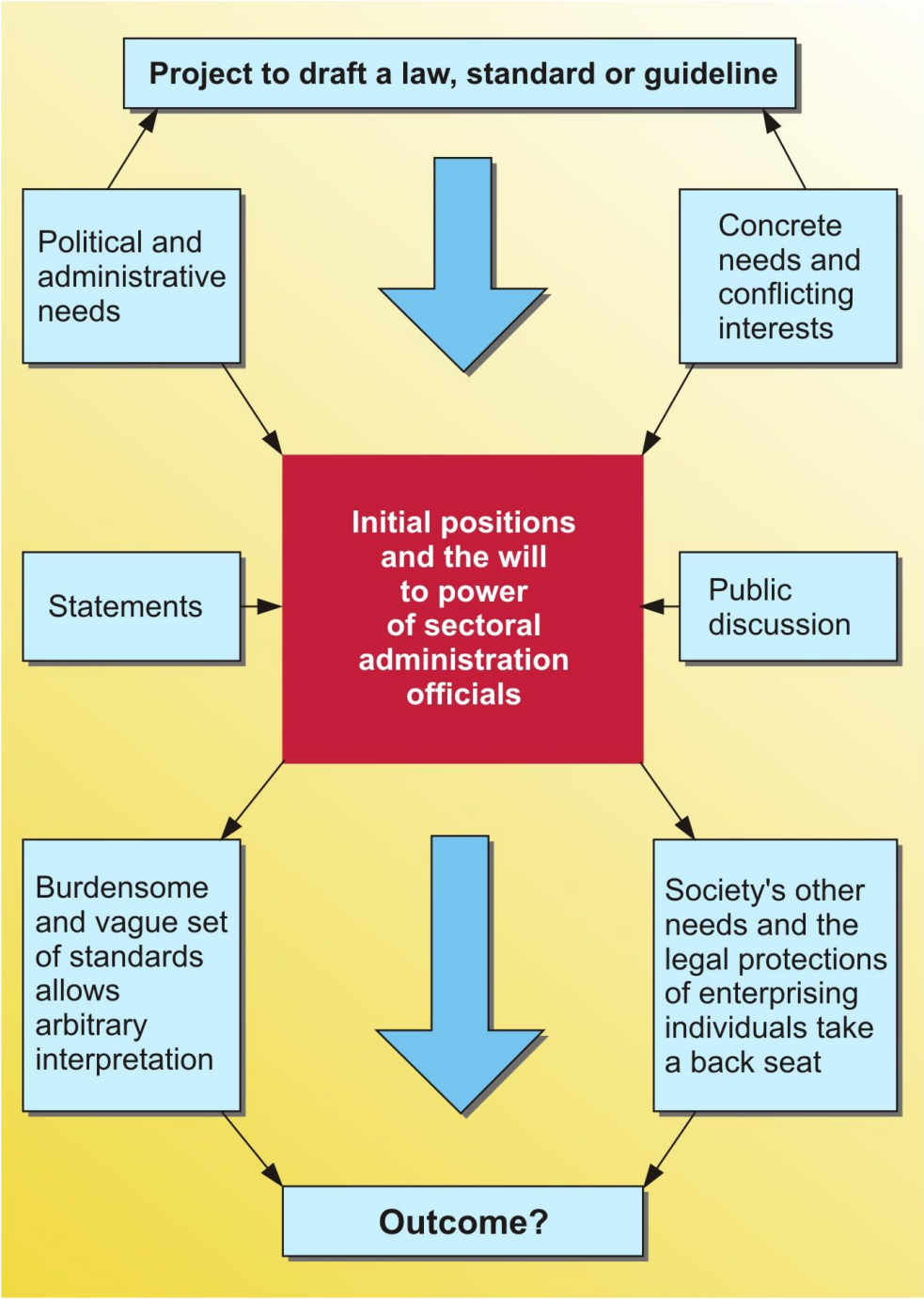


Figure 5.4. Schematic diagram of how a project to draft legislation, standards or guideline is handled in the environmental administration.

Consider **the exercise of power and reinforcement of the power structure** in the case of an infrastructure project. We have the Nature Conservation Act and the Environmental Protection Act. On top of this, we now also have the EU Habitat Directive, the environmental impact assessment legislation, the Natura 2000 network and some absurd waste management regulations.

From society's standpoint it would be worthwhile to consider the benefits and drawbacks (including environmental benefits and drawbacks) of the project and its options as a whole. However, environmental standards do not call for this and the environmental administration does not support this. On the contrary, both are focused more than ever on details. This opens up huge possibilities for arbitrary exercise of power.

Infrastructure projects almost inevitably provoke clashes of interests. Many people tend to oppose any changes in their immediate vicinity. Indeed, in Southern Finland it is difficult to find a project that a private landowner, a nature conservation group or a sector official does not oppose. A suitable legal basis for opposing the project can always be found somewhere in the often contradictory mass of environmental standards and guidelines.

Fighting over the zoning or permit conditions of a project can draw out the project schedule. Getting final decisions from the courts can take years, and even a decade. This can kill a project or at least hamper it so much that the complaining party can extort major changes in the project or walk off with a huge monetary payoff for the nuisance value.

When the state has clung to its methods that have allowed complaint processes to drag on for years, it has unreasonably conferred power on certain individuals, environmental groups, and above all, its own sector officials. Politics is currently fashionable, and many people feel good when their neighbors or representatives of large organizations are forced to sit and listen humbly to their views. If their reaction is not desirable, they pay a high price.

Let us return to the Vuosaari harbor project. It was democratically decided to move the cargo handling harbor from the heart of Helsinki to a remote eastern part of the city. The project helped reduce heavy traffic and traffic jams in the center of the city and CO_2 emissions throughout the greater Helsinki region. It also opened up space for building new apartment buildings and offices in the downtown area, which created jobs and new economic activity.

Yet the project was tied up in the courts for a decade on a range of environmental grounds. Participants in the disputes included environmental politicians, private landowners, nature conservation groups, companies that benefited from sabotaging the project, as well as the Ministry of the Environment, and the local environmental administration.

Opponents even mobilized the EU Commission and European Parliament's appeal's board to study the harbor project. Power is so sweet that the EU could not keep its hands out of city politics in a member state. The project promoter, of course, was the one sustaining damages.

This kind of a conflict situation offers the environmental administration and political opportunists unjust possibilities to submit the project promoter (Figure 5.5). They can burnish their own credentials with a tough line, and mercilessly order further investigations, and further burden the project with baseless environmental investments, research studies and safety measures. All this sets new precedents to be used on the next project developer.

An interesting aspect of development is the building of power positions through zoning and nature conservation legislation. A sector official can rather easily use zoning markers, often for laudable ends, to limit the future land use. When other needs emerge in zoned area, the fact that the area has been marked as special generates power for the department exercising its power. It is difficult to use the area for the new purpose regardless of the dimensions of original zoning aims or the priorities of society.

When a problem has international dimensions, the position of power is further strengthened. The declaration of the Helsinki island fortress of Suomenlinna as a world heritage site is an example. Finland's National Board of Antiquities blocked a small project to straighten the adjacent Kustaanmiekka channel. The purpose of the project was to improve navigational safety at the riskiest spot in Finnish waterways used by passenger ships and tankers.

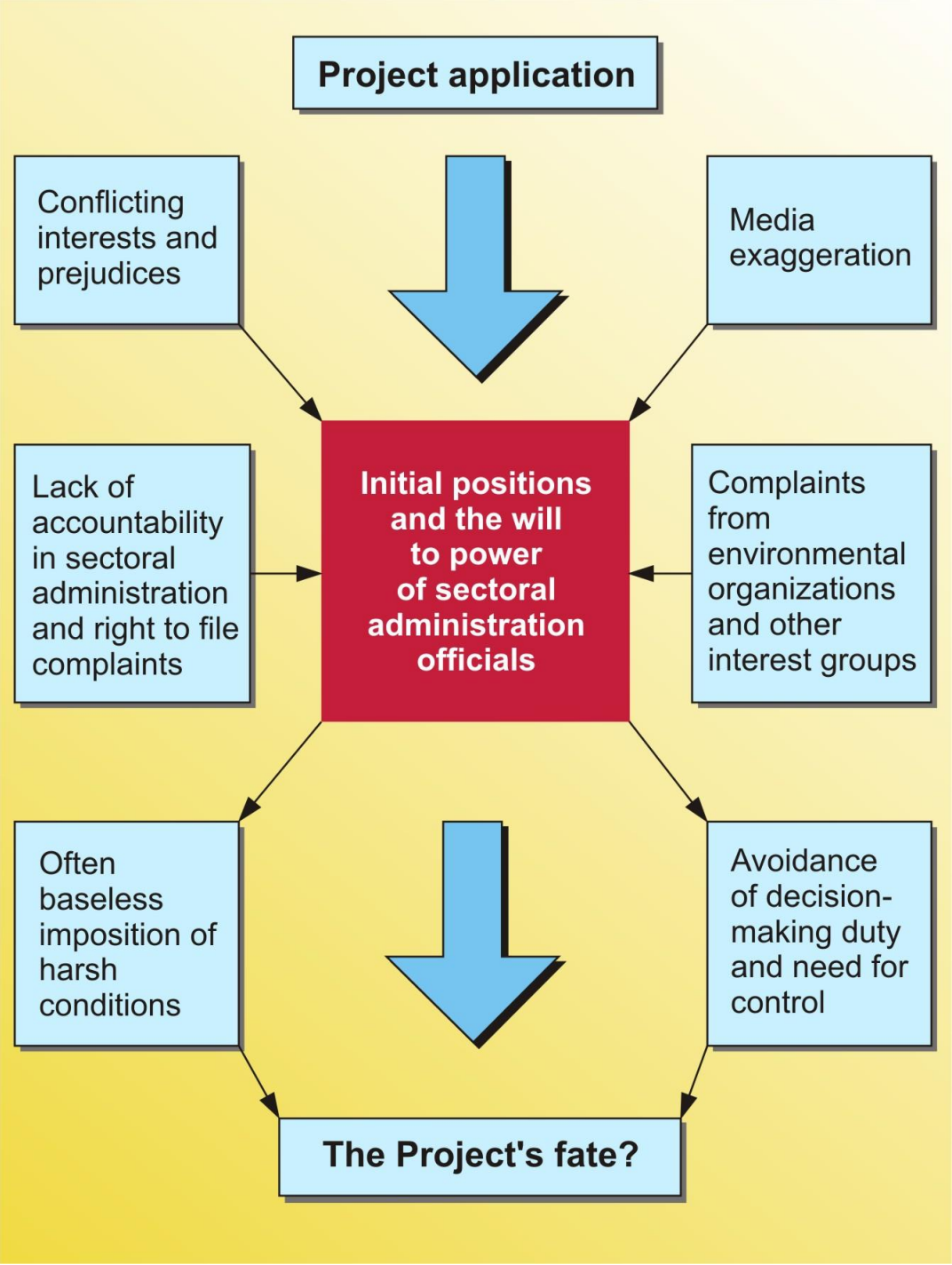


Figure 5.5. Handling of a permit application in the environmental administration.

Companies and industrial organizations operate in the field of marketing by seeking to turn images associated with environmental matters to their advantage. A large construction company markets the ecological and lifecycle properties of its products. A hamburger chain creates an image of social responsibility by recycling its waste.

The cover of an energy company's social responsibility report displays a young woman innocently dressed in white to push its theme of cleaner products. The environmental balance sheet shows side by side ten million tons of CO_2 emissions a year and 40,000 tons of normal trash.

Nokia and the World Wide Fund of Nature (WWF) joined forces to launch a cellphone recycling operation that was noted in the national television news broadcasts. The image given to the viewer was that Nokia would give the WWF two euros to the "Save the polar bear" campaign for each old cellphone mailed in. In an interview, Nokia's representative emphasized his company's sense of environmental responsibility.

Finns dispose of about a million cellphones a year. Assuming each handset weighs about 100 grams, the amount of waste is about 100 tons, mostly metal and plastic. What is the actual benefit of returning 100 tons of metal and plastic directly to Nokia as compared to returning it via cellphone retailers for recycling? The campaign made Nokia's smaller competitors look bad, which may have been the whole point.

Through manipulative shield-burnishing arguments, large corporations and industrial organizations conflate the scale of problems and reinforce the image of a universal problem.

Thus, the dominant images of environmental problems facing society come pre-packaged and pre-distorted. This gives the environmental administration broad possibilities to influence the images of the problems from its strategically central position. We get a constant stream of images on environmental threats, mountains of trash, and bucolic settings ready to be destroyed.

The theme of environmental crime as marketed by the environmental administration also provides an interesting insight into manipulation. A deliberate release of, say, bunker fuel, into the sea is a clear case of an environmental crime. But what about some minor dredging activity near the beach of a summerhouse without a permit? The environmental administration has extended its authority under the waters act into gray areas, ignoring the traditional rights of use and enjoyment attached to one's land and the fact that that the state has no business of getting involved unless it has a real reason to do so.

Consider now the farmer who sees his possibilities for making a living gradually vanishing. His tractor is falling apart and he doesn't even have enough money to take it to a special dump site. Thus, he tows his tractor into the barn with the other junk to await better times. At some point the barn may be classed as an illegal dumping site under formal interpretation of new waste legislation. The bankrupt farmer can be charged as an environmental criminal.

Such things are reminiscent of the Catholic Church during the period of inquisition. Through the absurd regulatory bramble, productive people and organizations are made to feel sinful. Administration, interest groups, the environmental movement and the media all cast aspersions on these bad actors, while the environmental administration makes it clear that

forgiveness and rehabilitation require traversing a path of humility and acceptance. Attention turns away from the environmental administration's own unreasonable acts. The illusion of its helpfulness and beneficence is strengthened.

The vicious circle of amassing power continues to widen.

Power and accountability

There is a lot of effort to influence public power for own ends. The role of bureaucratic and industrial organizations, media, environmental groups, expert organizations and interest groups has been discussed above. Also professional organizations routinely seek to influence the state to advance the cause of their members in the society. The existence of the lobbying industry indicates that those with the resources and organization do have influence on public decision making.

There are also individual bureaucrats, media reporters, scientists and others who are using their public positions to promote their own views or to satisfy their own subconscious needs.

The Economist /62/ wrote a story of 830,000 hectares of pristine tropical rainforest in Cameroon that would combine three major national parks. Instead of leasing the area for logging it is offered for conservation at a prize of 1.6 million dollars a year. This looks like a bargain for any government or organization worried about the fate of biodiversity or old forests. For some reason there have been no takers.

If the exercise of power is to benefit an organized society, those who make decisions and exercise that power should be accountable for their actions. There should also be limits on that power.

When the EU-constitution was being drafted, the EU Commission wanted, according to then environment commissar Margot Wallström to help Europe in environmental matters /75/. That can be done if 1) the principle of sustainable development, 2) environmental conservation and 3) the principle of participating democracy are included in the constitution and if 4) the division of power on setting environmental policy between the EU and member states remains blurred.

This helping line sounds oddly familiar. Conquerors have used it to justify their actions. Were Wallström and the DG of environment genuinely seeking to help Europe or were they after something much sweeter? To what extent can the ideologically guided sector organization based in Brussels help Europe – and how much damage might such an organization inflict with all this power?

The EU-commission has been aggressively pushing the use of biofuels in Europe. Any serious expert could have figured out in a week that the carbon balance of producing biofuels from maize and other agricultural plants is not good with present technology. It is also quite obvious that taking fields away from food production increases the price of food. Now the EU policy has contributed to driving a hundred million people into a hunger trap. Who shoulders the responsibility and how?

When Finns voted to join the EU, most thought that they were voting for a free-trade area or increased national security. Now we find ourselves in a system in which the EU's power encroaches on many aspects of our social activities in quite surprising forms. Certain characteristics of the new bureaucratic constellation of power explain some of this:

- Finns generally recognize at least some of their own politicians elected to the European Parliament, as well as the one holding Commissioner post, but they have very little awareness of the representatives of other countries. They know even less about what goes on in the EU and how this may affect their lives. So far Finnish government is being held responsible for developments in our country, not the EU institutions.
- Politicians, sector bureaucrats and judges exercise the EU's power. This administrative elite lives well paid in a golden cage far away from the problems of average Europeans. They interact in their official capacity mostly with politicians, sector bureaucrats, lobbyists, lawyers and experts that have specialized in serving the power structure.
- Although the EU is basically an economic and monetary union, the central actors rarely have the personal experience needed to promote European welfare in their work.
- There seems to be an unrealistic view prevailing within the EU that its bureaucracy possesses skills to deal with any kind of matter. The EU Commission, for example, has told the City of Helsinki how to handle its zoning matters.
- The goals of EU environmental policy are already set in its strategies, programs, and framework directives. Bureaucratic wisdom, eco-ideology, and political horse-trading are so highly valued that the real basis and risks of policies are seen as a minor aspect that only deserves brief consideration.
- When eco-ideology and unnecessary, over-dimensioned environmental legislation projects are transformed in the hands of politicians and officials into fungible power capital, the temptation to use this new capital easily becomes overwhelming.

Juhani Ylimaunu tells the story of the seal wars in his study on the relationship between man and seals /80/. Basically, certain environmental movements, including Greenpeace, started several decades ago a campaign against seal hunting that used images of baby seals being clubbed to death. Seal hunting was portrayed as barbaric slaughter. The cubs screaming like human babies were killed and cut under the crying eyes of their mothers. The campaign received considerable media attention. There was less discussion of the reports on increased seal populations and of worries on the part of local people about the threats that the ending of seal-hunting posed to their livelihoods and cultural identity. As a result of the campaign, the EU forbade the import of seal products and the market collapsed.

In Northern Canada and Greenland, seal and whale hunting are part of Inuit cultural identity. Inuit lifestyles and ways of earning a living were ignored by the EU in this case. The collapse in the price of seal skins forced many Inuits onto welfare. Communities fell apart and villages were deserted, while suicide and alcoholism increased.

Thus, the EU ignored local conditions and cultural issues. EU decision-makers were interested in responding to politically correct images prevailing in the continental Europe. They were not interested in facts or in the social, cultural or even ecological consequences of their actions.

The European Union's basic problem is, that none of its party groups, administration sectors or individual users of power is really accountable for anything, nor are there any clear limits

on the powers they exercise. The EU, however, increasingly decides how European countries and people should live and use their money.

Even if the EU was run by the most competent and disinterested politicians, officials and judges, it still can't serve the interests of member states very well in this setting. Without accountability and clear limits of power the system continues to rot from within. Opportunities connected to the co-operation of European countries turn against themselves when bureaucratic power under the demagogic disguise of making a better world becomes an objective in itself.

Finland's environmental administration is making Finland a model for EU environmental policy. First, along with the other Nordic countries, it is pushing an abstract eco-weighted version of sustainable development ideology into EU policies. After that, we are supposed to pursue strategies, targets, and tougher standards than those set in directives regardless of whether it makes any sense.

This is building up EU power and promoting sectoral agenda at a heavy cost to the nation.

Finland's self-schooled Natura 2000 expert Markku Sahlstedt asks why Finland ceded its decision-making power and jurisdiction of over a fifth of the country's area to the Natura 2000 network (including areas where activities might impact Natura values, an extension of power aggressively implemented by the administration) to a super-governmental agency (through the environmental administration), when most of the species and habitats mentioned in the directive already enjoyed a level of protection so good that the relative level of protection provided by the directive only called for a setting aside 5% of the country's area.

Sahlstedt further asks why Finland did not present the EU with a bill for the area ceded, as permitted under the directive. He suspects that the EU auditors would have refused to pay for the areas not explicitly covered under the directive and that those areas would have been cut out of the Natura 2000 network. For example, the bill alone for the lost electricity production from the controversial decision of protecting the Vuotos area with Natura from a proposed regulating dam was cautiously estimated at more than €10 million a year.

In principle, the environment minister carries the political responsibility for the environmental administration, but the political memory is short and its connection to facts rather facile. For example former environment minister Jan-Erik Enestam now enjoys the salary and prestige of a director at the Nordic Council, at taxpayer's expense.

In practice the environmental administration is not merely a machine that serves a democratic society but a source of power of its own. It may currently have much more power than its political masters. Even individual bureaucrats are strong users of power. It looks like the tail has started to wag the dog.

Yet the environmental administration is not accountable for its actions or the consequences of its decisions in any way. Bureaucrats are nearly impossible to fire, and they enjoy tremendous legal protection of their pension benefits. The good life for environmental bureaucrats will be protected as long as the Finnish government maintains some semblance of creditworthiness. They can safely promote their own views and quests for power through legislation and governance at taxpayer's expense.

Finland's environmental administration typically responds to criticism by noting that the parliament writes the laws or that it lacks sufficient funds to do the job properly. The parliament, in turn, blames the experts for their bad advice in designing legislation and later implementation. Both blame the EU.

In reality, the environmental administration has itself participated in the EU policy process, planned the central structures of legislation and focused its resources on the drafting of legislation and standards. The Finnish parliament and its standing committee on the environment have full power to use their common sense and decide which experts to listen to. They also have the power to set the policy direction and the power to put administrative organizations in their place.

Indeed, the juggling of blame is rotting of accountability.

Finland's public administration lacks a tradition of reviewing unfortunate events. For example, certain politicians and bureaucrats reputedly enjoyed over-cozy relations representatives of foreign governments using them to hit political opponents and selling national sovereignty to advance their own careers during the days of Finlandization. This has never been investigated openly. The unwillingness to examine failures of the public administration has two effects on the environmental administration: 1) nothing is ever learned, and 2) abuses of public power are allowed to continue.

The media has an important role in democratic society by bringing views with merit to the fore in public discussion. The media possesses a great deal of conditioned power.

A *Helsingin Sanomat* article on high heavy-metal content in soils in southern Finland /55/ was spices up with a map bearing the caption "Fallout from Chenobyl still affects the Finnish environment." The map showed distribution of soils with cesium isotope in the humus layer. The radionuclide content varied between a tenth of a bequerel to a few dozen bequerels per kilogram.

The article did not explain, however, that typical agriculture soil contains about 300 bequerels per kilogram of radionuclides. Publishing that fact would have taken much of the edge off the story. The facts as such were correct in the story, but unless the reader was up on his local bequerel content, he could easily get the wrong impression of the situation.

Ari Valjakka, editor-in-chief of Turku's main paper, *Turun Sanomat*, characterized the current media principles at a Port Seminar on September 22, 2004, with the following comment, "One should always speak the truth, but there is no reason to reveal the entire truth." In the same context, Valjakka said he had only once been held liable for the paper's reporting. The paper paid a few thousand euros in damages.

When the *Turun Sanomat* sensationalized the "large amounts of TBT" in the Naantali harbor, it put the final nail in the coffin in concert with environmental bureaucrats in destroying the port development plans. The economic sacrifices and the opportunities for good jobs for hundreds of people vanished.

An award winning British journalist Nick Davies has written a book of falsehood, distortion and propaganda in modern media /5/. He starts with the Y2K, i.e. the worldwide disaster that was supposed come after computers would crash at the turn of the millennium. As it turned out nothing such happened. The hysteria was cooked up by the media.

Fabricating and recycling stories is now a way of life in an industry that is supposed to tell the truth. Telling outright lies is not out of the picture, but as Davies puts it "in a free society lies rest quietly and in comfort inside clichés". Professional courtesy and the game theory associated with tackling media power makes this easily understandable.

Media organizations are accountable to their shareholders for their economic performance. They are not responsible of the images people are drawn to in their publications or any resulting developments. The writer and editor strive to fit existing narratives in creating stories that touch the reader. In environmental journalism this has meant fabricating or copying emotionally charged stories of unknown threats and delivering guilt and then recycling them without making any elementary checks.

As soon as the general public began to comprehend how insignificant the environmental impacts of the waste water releases at the Kaukas mill really were, the media started to blame the poor communication of the plant for the media catastrophe. The media noted that fortunately there was no serious damage to the environment, as was known to anyone who wanted to know from the beginning.

But what would the *Helsingin Sanomat* have offered its urban readership constantly driven by the paper to meddling with other people's affairs if this matter was made clear from the beginning?

Media organizations do not generally tolerate information that undermines their credibility. They act like other unaccountable power machines trying to ignore it first. If this comes impossible they use strategic misrepresentation to defend themselves and to ridicule the messenger.

Only top-tier publications such as *The Economist* and *The New York Times* have had the backbone to print retractions and correct misinformation rapidly and honestly. They have not done this because they like to do it, but because other powerful media organizations with different values compel them.

When public administration and the single minded nationwide media push to the same direction we are dealing with a strong sociological process. This kind of a power concentration is worrying.

The environmental movement started out with quite honorable aspirations and goals /41/. In a democracy it is necessary for people and citizen groups to bring up other perspectives and information that conflicts with the prevailing official view.

Environmental groups have done valuable work in dealing with a variety of environmental problems creatively, including helping to recover populations of birds of prey decimated by PCB and DDT in the food chain, as well as monitoring of the effects of forest clearing in the Amazon. These acts can be seen counterbalancing ruthless exploitation of the natural world.

Now that Finns have gradually got the country's environmental problems fairly under control, environmental groups have turned to manipulating information to secure their own well being. The marketing of environmental groups has begun to resemble corporate marketing. Some groups even brag about their ability to handle public opinion.

Consider the following case of street marketing. A young man stops you on the street and starts a story. Their organization has scientific evidence indicating that the containers planned for end storage of nuclear fuel (copper capsules surrounded by bentonite in bedrock) will start to leak in 100 years (highly improbable). This claim is followed by the unknown threat that in the next 50 years the waste will leak to the sea (the radioactive impact of such a leak in sea environment would be minuscule compared to background radiation). The deal closing line follows in form "Please sign here to become a regular contributor in our efforts to establish a research laboratory".

In recent years, some of the most important focus areas for environmental groups in Finland have been the forest industry, energy projects and harbors. These have been attacked by conjuring up threats, exploiting appeals processes, and mobilizing allies in the state bureaucracy and media. Finland's industrial customers in Europe have been pressured.

Forest industries are a major pillar of Finland's economy, access to reasonably priced energy supplies is essential for the success of Finland's primary industries, and 80 % of Finland's foreign trade passes through domestic harbors. Thus, the environmental movement focuses its efforts directly on the core economic activities. From the movement's point of view this approach has been extremely fruitful in terms of money and power.

Nothing prevents environmental groups from buying old-growth forests or engaging directly in environmental remediation work. The movement, however, is not known for selfless sacrifice to help nature, but rather for media stunts. In other words, it is not ready to give up anything for reaching its goals. It expects others to make sacrifices. It is ready to cause a lot of harm to other people, but does not bear any responsibility for the harm caused.

It is important to note that those who finance the environmental movement either in good faith, sanctimoniously or to buy protection also finance its acts of manipulation, aggression and power.

With the swelling of environmental standards, broader opportunities to file appeals and longer permitting times, **interest groups** have also become major users of power. This is illustrated by the history of two families seeking to build a condominium together in the Helsinki region.

The families with small children purchased an expensive lot on which to build. The plan was to build their condominium quickly over the year so that both families could move in under their own roof by Christmas. The neighbors, however, were not happy with the proposed construction plans. Although the building plan had been approved by the municipality, complained about, among other things, a simple car shelter that, in their opinion, reduced visibility of a curve in the road and thus endangered traffic safety. Before construction, however, a row of spruce trees blocked visibility of the curve in the road altogether.

The families spent the following months trying to get their building permits by negation and accepting changes in their plans. The construction schedule was lost. Winter hit when the

foundation work had started. In the meantime, the construction business began to overheat. When workers were available, there was a shortage of materials. When there were materials, there were no workers. The cost of the project skyrocketed. The families failed to get under the roof even after two Christmases. When they did move in, they lived in a construction zone. With a minor interest of their own, the neighbors inflicted a long nightmare and massive economic losses on the families.

Unfortunately, interest groups include people who are ready to cause firms, industrial organizations, small businesses or their neighbors, considerable damage with only the slightest justification. Some are even ready to take economic advantage of the situation. There are also those that see the use of power and humiliation as ends in themselves. The more interest groups there are, the greater the likelihood that there is someone ready to make frivolous complaints.

Interest groups, of course, are not accountable for the possible harms they might cause.

Under normal conditions, the lion's share of environmental impacts is caused by **companies, other productive organizations, small operators and average people**. These organizations and people are responsible for their economic performance and work. They also contribute the most to our material well being.

Especially large firms are often accused of indulging in psychopathic behavior. Blindly pursuing profit targets in the fray of competition, they stand ready to use their unfettered economic power and to manipulate people. They are ready to crush the competition, harming employees and customers, damaging the environment unhesitatingly and without empathy or regret /63/. There is some truth in this.

Western companies, industrial organizations, small operators and people, however, cannot act as they please. Their activity is being monitored and regulated in many ways. The company or the sole proprietor can easily be held to answer publicly, financially, and even legally for their actions. This imposes strict limits on productive activities in many respects.

Power resides with the people

In Western democracies the power of the state is supposed to reside with the people. This is true to the extent that people's values, beliefs, opinions, and even imagination, do direct the development of a democratic society. This is why there is so much effort to influence people. Manipulation is a very effective way to influence. The greatest resources for engaging in manipulation are in the state administration.

Most of us prefer to leave complicated matters to the state bureaucracy and experts. Under this arrangement, we expect that bureaucrats, experts and their political leaders possess superhuman wisdom, accountability and the ability to balance interests in promoting the overall needs of society.

World history is littered with utopia-seeking ideologies. The ideology of sustainable development (not to be confused with rational, forward looking and responsible behavior) is just another in this group. Although all attempts to build societies on ideology have failed, mankind has yet to figure out that ideology is merely an instrument of power.

Some societies have also attempted great leaps forward. Now we try at the same time through heavy-handed administrative action to make large strides on energy issues, efficiency in material use, environmental protection, waste management, and nature conservation. Can we succeed in all these things at the same time? And if we succeed, what have we actually achieved? What is the price and what are the risks?

Above all, we are responsible for our own nation's future. We can, and should, help others, but only when our own affairs are in order. Helping others only makes sense when these others really want our help. It succeeds best when we help others to help themselves.

Just a few years ago during the information technology boom, people were told to get into stock market through mutual funds as a way to save for retirement. The sales pitch was that the returns on shares were always better than bank savings. Anyone with basic education could have checked that this was not true even in the United States of America in the time span of retirement saving. Yet many people fell into this sales pitch because investment bankers and other fine experts convinced them.

Now the IT bubble has burst. The marketing men and the market operators have received their percentages. The portfolio managers are enjoying their fees. However, none of them is responsible for anything. The money belonged to the pension savers. They are responsible for their investment decisions.

Similarly, the environmental cluster markets us a secure future under the guise of sustainable development. People with basic education can easily discern that Finland faces no imminent threat of ecological cataclysm or raw material shortages. They also understand that even if the population explosion continues elsewhere, there is little the Finns can do about it.

We Finns, however, have not bothered to analyze matters ourselves, when our own environmental politicians, administration, research institutions, environmental groups, and media organizations in Helsinki paint an alternate reality. We have become the objects of manipulation.

Now we surrender considerable power on environmental matters to these groups. We have failed to notice that many have grabbed on to the opportunity like an unscrupulous psychopath. Blindly seeking their own gain, they have trampled on the rights of others and destroyed conditions needed for good life – without empathy or regret.

If we trust uncritically in a comprehensive ecological problem, massive administrative blessings, as well as the idea that democracy includes a broad right to appeal without responsibility to other people or the parts of society that suffer the resulting damage, we give the environmental cluster an open mandate to exercise its power unilaterally.

The power cluster is responsible for nothing, of course. It is us, the people, who are responsible, because we will ultimately pay the price.

6. ENVIRONMENTAL POLICY AND THE DECLINE OF ECONOMIC FUNDAMENTALS

The old wisdom says Finland makes its living from its forests and metal industries. Even with the meteoric ascendance of Finland's telecom industries led by Nokia over the past two decades, this is still true. Finland earns the bulk of its export income from companies operating or offering expertise related to the metals and forest branches.

Of course, the highly developed domestic economy also requires a rich assortment of goods and services. Non-industrial public and private sector activities dominate the economy in terms of gross national product (GDP). Industrial activity is nevertheless essential to sustaining Finland's high living standards as well as to funding public sector and pensions.

Respected economist and former US treasury secretary Robert Rubin /54/ has spoken on the threats on the dynamism of economy by the society's growing tendency to eliminate or minimize risk. Instead of making cost-benefit judgments of risk, the result is too often regulation, legislation and litigation outcomes whose costs in other areas greatly exceed the benefit of risk reduction. He considers this to be one of the major challenges facing the American society.

Industrial and productive activities involve environmental impacts. Most impacts are minor or insignificant, but in some cases they can be significant or even huge. To understand how new environmental legislation and its application affects macroeconomic activity, we first assess the economic bases for engaging in an industrial or productive activity.

Investment analysis – the starting point for new economic activity

Markets constantly evolve. Companies attempt to respond to changes in demand and increased competition by investing in advanced production technology or new production activities. Multi-level studies help identify promising investment targets. One typically starts by studying the business environment, trends and business potential. Conceptual or pre-feasibility studies are made of promising project ideas. If the preliminary study for a project shows particular promise, it is followed up with a feasibility study.

The central results of investment and risk analyses from the perspective of corporate management are summarized in Figure 6.1. The key points of interest to management in their decision on whether to go ahead with the project are the rate of return on investment (ROI) and the risks associated with the project. Also capital exposure and payback time are important.

Large corporations typically have several investment projects under development or consideration at a given moment. These studies are considered against the background of the overall corporate strategy. When the potential ROI is large, the corporation may be willing to take large risks. On the other hand, when the ROI looks to be modest, the management will not even consider a project with more than minor risks.

Risk can be divided into two classes: manageable risk and open (i.e. unmanageable) risk. Such risks as market risk, technical risks, currency risk, and scheduling risks can all be anticipated and managed up to certain limits.

The amount and nature of open risk often assumes a dominant role in investment decisions. For example, a political risk is an open risk. Consider Venezuela, where foreign oil companies are forced to surrender of their investments and operations to the national oil company. When such open risks have a significant potential of realization, it certainly affects the willingness to invest.

The potential of open risk realization has increased also in Europe in connection with industrial and other productive activities. Environmental issues are a common source, sometimes with merit but increasingly not.

From society's standpoint, investments in industrial and other productive activities are extremely beneficial. A decision to invest provides society at practically no risk with a new income stream and new jobs. Furthermore, there will be work for subcontractors and the service sector, as well as indirect tax income generated throughout society.

Finland like the rest of Western Europe has high costs, a relatively open economy, and generally low economic growth. Extremely profitable enterprises are rare. Companies operating on international markets can invest in Finland only as long as the business environment remains favorable, other operating conditions reasonable, and risks manageable.

Once Finland's active, rational, and efficient court system was a huge advantage in international competition. Now the country's new environmental policies, environmental legislation and administrative culture have changed this situation for the worse.

Permitting processes

Timing is critical to large companies as well as to small operators seeking business opportunities. Their hope is to meet emerging market demand by investing in a timely manner in new products and production capacity, and simultaneously phase out old facilities and mature product lines. Feasibility studies play a central role in restructuring of industrial and production organizations.

Feasibility studies for industrial projects are expensive propositions. Studies must consider many issues, including market and competitor analyses. A number of alternative production schemes are also usually studied first. Then process engineering, construction design, logistics planning, and operating plans have to be prepared for the selected scheme. Then one must scope the significant environmental impacts and try to find out the principal conditions that the environmental officials will impose on the project. A realistic implementation schedule must also be prepared for the project. Discussions with potential partners and memoranda of understanding are drafted at this time. Finally cost estimates, cash-flow and profitability projections, risk analyses, financing arrangements and the final viability analysis are performed. The process typically involves iteration rounds and back-up plans also.

From the standpoints of the project promoter and society, environmental issues are only one aspect of determining project feasibility. Yet their weight in investment decisions is often very large because they influence the overall project schedule and pose potentially large risks.

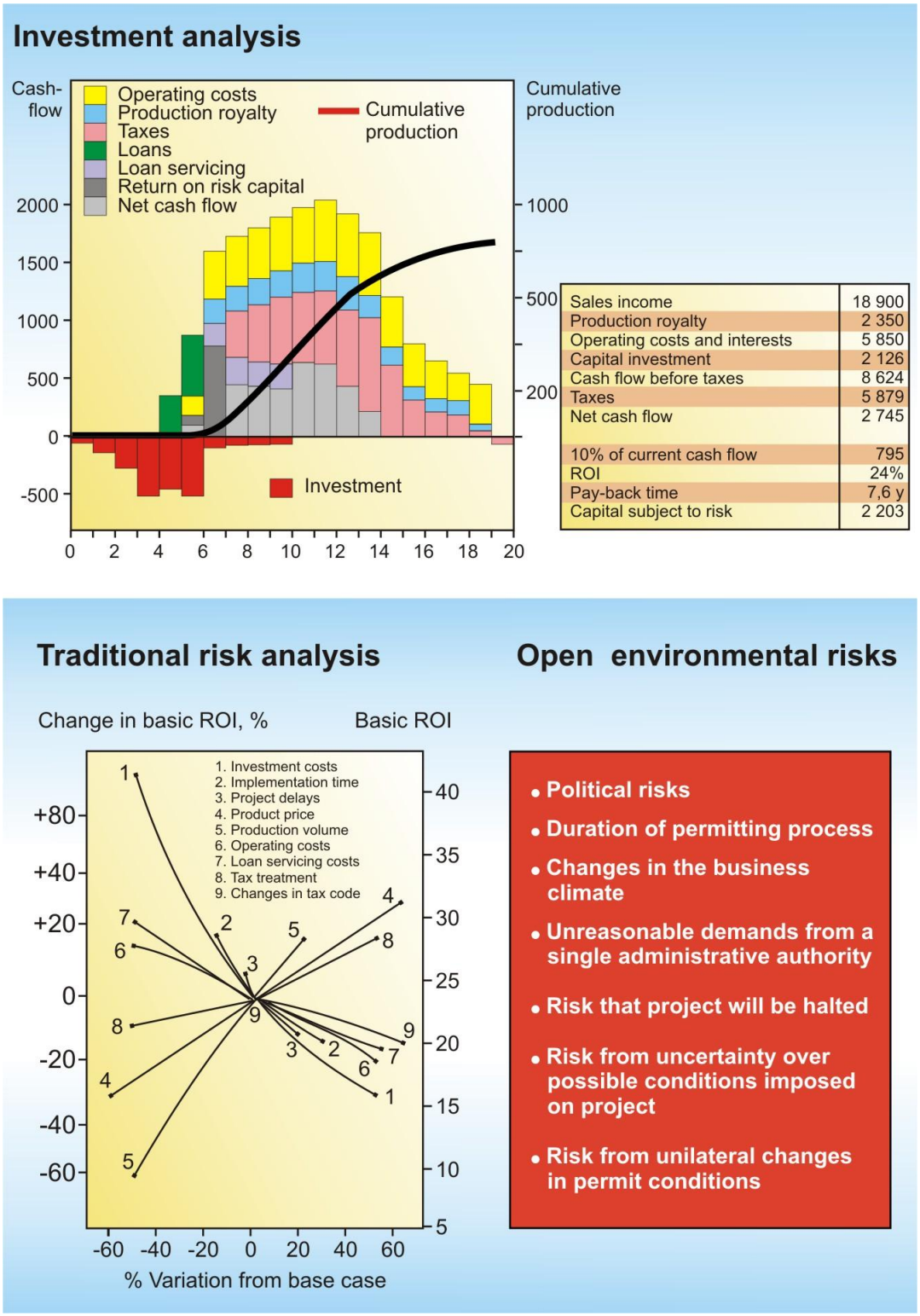


Figure 6.1. An example of the key factors in investment and risk analyses (modified from /19/).

Figure 6.2 considers the impact of two alternative permitting processes on the implementation timetable of a hypothetical industrial project. Under ideal Example A, we see that the permitting process proceeds at a reasonable pace and that the outcome is predictable. In this case, the project planning can be done in parallel to the permitting process. In addition, the project partners (process suppliers, society, clients, subcontractors, etc.) can plan and shape their own schedules according to the project timetable. In this case one can grab the business opportunity.

On the other hand, when the permitting process begins to drag on for some indefinite time, say three to eight years as in Example B, the corporation has little incentive to begin the costly project planning phase until the permits are issued. A long wait for permits can easily double the time from project conception to the commencement of production. When the permits finally issue, it is likely the market situation has changed or competitors have already reacted to the market opportunity. Moreover, the original basis of the permit may have lapsed, legislation may have changed in the interim, or the company may have lost its ability to take on the investment.

This kind of a permitting process is not very fruitful for building up new competitive productive activity. In many cases it is not worth pursuing at all.

The environmental impacts of the project are usually known well enough after the pre-feasibility stage to estimate whether there are any rational grounds against implementation. However, duration and the legal hurdles connected to the several parallel permitting processes are often much more difficult to predict.

As was well demonstrated in the Vuosaari harbor project, Finland's massive body of environmental standards today provides an endless assortment of bases for disputes. Unfortunately, this incident was not the only one of its kind. For example, a project to build a pipe coating plant in Kuusankoski ended in the death due to an over-extended environmental permitting process. It is hard to imagine what environmental issue in pipe coating was so intractable that it would prevent the plant's establishment.

As a result of new European environmental policies, standards are now mined with irrational rules such as those governing flying squirrel habitat and TBT levels. Common sense and proportionality take a back seat to obscure theory and legal gymnastics. The project promoter can no longer have faith in a timely and rational outcome of the permitting process.

Establishing a new industrial plant is in itself challenging to the project promoter. Add to this all the possible parties that may attempt to obstruct or modify the project proposal, including the local environmental center, other regional administrations, municipal offices, and state offices, local land owners, nature conservation groups, competitors and local residents.

The project promoter usually tries to manage the permitting process risks by giving out information, arranging press conferences and public events and negotiating in advance with key officials and interest groups. It also tries often to comply precisely with official demands. The project promoter may try to exploit its public image to sell the project to the public.

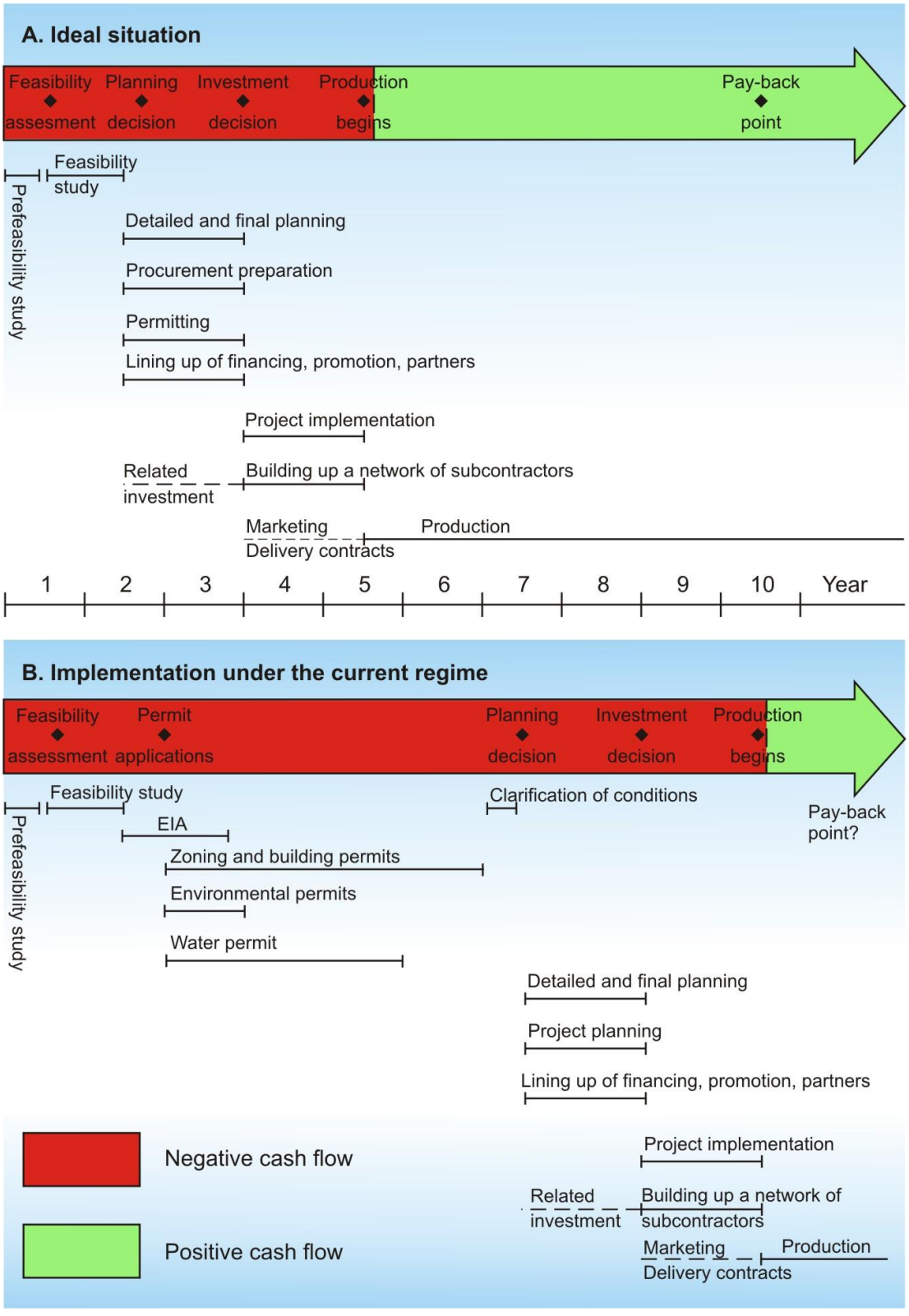


Figure 6.2. The effects of the permitting process on the implementation schedule of an industrial project – ideal and current scenarios.

The project promoter, however, finds himself in a poor strategic position. Legal protections are weak and appeals can be filed no matter how hard the company has worked to avoid them. In many cases, the opportunity to dispute the permit decision means the possibility to set the terms of the permit. The project promoter is left with the choice of approving those conditions, or abandoning the project and booking the loss of money and man-hours.

For example, in zoning private individuals and organizations generally resort to the appeals process when they want to secure or protect their own interests. Project promoters in turn routinely pay off potential nuisance-bringers ahead of time. These costs are then passed on to the ultimate user (i.e. the apartment buyer, the office space renter, or the energy consumer).

The project promoter is in an even more disadvantaged position if the project has moved through the expensive detailed planning phase and the project partners are merely waiting for the permits to clear. A good example here is the Leppävaara development project and the diversion of the Monikonpuro Creek. After long planning and complex mobilization of the one-billion-euro project involving the City of Espoo and other parties, the project timetable was nearly torpedoed by the city's own environmental office. The squabble was over the faith of a tiny fish population that theoretically might have been endangered from the project plans to shift the course of the creek.

Case: Effort to set up an offshore wind farm

Figure 6.3 provides a detailed schematic of the zoning process for a typical industrial project. This case example is an attempt to place a 50 MW wind farm in a shallow sea area close to industrial and harbor activities. If any party maliciously opposes a project, its chances of being implemented fall dramatically under Finland's act of land use and conservation.

In this case, the project was halted even before the zoning process when the environmental administration requested implementation of the environmental impact assessment (EIA). Finland's EIA act says that officials have discretionary power to demand the EIA process when the project is likely to cause significant harmful environmental impacts comparable qualitatively and in scope to those listed in the EIA statute.

In the feasibility study, the project promoter studied the project's main anticipated environmental impacts. The calculations showed that the project had an overall positive environmental impact several orders of magnitude greater than the negative environmental impacts. The negative environmental impacts were estimated to be about a thousandth of the EIA limit of a coal-fired power plant with fuel efficiency of 300 MW (Appendices 2 and 3).

The local environmental center said in a statement that the project had potentially significant environmental impacts. What these were exactly was never stated. By chance, the local dockyard announced the same week that it was negotiating about layoff of 900 workers. In Germany's all-important metals industry, wind turbine construction employs today more people than its shipbuilding industry.

When the Ministry of the Environment reviewed the local environment center's decision, it reaffirmed, adding that the project's environmental impacts may be significantly harmful for both migratory birds moving through the area as well as birds feeding and nesting in the area. In addition, the environmental impacts from project construction on water quality and

underwater life may be significantly harmful. A reference was made to the Vuosaari harbor project and possible harmful substances stirred up by dredging!

Recalling the "significance" of the environmental impact of the Vuosaari harbor dredging discussed in previous chapters, it is worth noting that in this case, wave action scours the sea bottom leaving a hard bottom in the wind farm area. The bottom could only hold insignificant amounts of harmful substances, because harmful substances are typically bound to the finer sediment fraction (as mentioned even in the HELCOM dumping guideline),

The EIA statute speaks of "likely significant" environmental impacts. The Ministry of the Environment speaks in its statement about impacts that "may be significantly harmful." Thus, the ministry manipulated the language of the EIA act in its statement. Such manipulation is against Finnish constitution. Manipulation like this has become common in Southern Finland, where the environmental administration is constantly seeking to extend its authority beyond its mandate given by the parliament. However, the administration is never punished.

The environmental administration attempted to use its strong position to advance its own goals at the expense of the project. Rather than submit to the power, the project promoter put the wind farm project on hold. The environmental administration thus killed an early attempt to increase the supply of clean energy in Finland, as well as an effort to develop new competitive energy technology for the Baltic market.

As a rule, even the most compliant project promoters these days expect to encounter disputes when they file for environmental permits in Southern and Southwestern Finland. Thus, good planning practices now dictate that the project promoter is prepared for a lengthy permitting process as well as the accompanying costs and risks. Project opponents can find an almost limitless supply of issues that deserve further investigation.

One way officials, themselves unfamiliar with a particular issue, deal with a new problem is to order further studies. This phenomenon is known internationally as the dilemma of "nice to know versus need to know." The original grounds for complaints or appeals can be augmented for example by new "scientific" discoveries. New conditions can be set on the project. This means that the conditions for industrial and other productive investments are poor in Southern Finland, except for those who can pass additional costs on to others.

Elsewhere in Finland, productive activity provides work for a lot of people, so the scale of an environmental impact is more likely to be taken into account. People are also more reluctant to file complaints or appeals and more willing to settle conflicts without going to court. Local officials often apply their common sense to a problem rather than seek direction from the main office in Helsinki.

Thus, better investment conditions for industrial or productive investments are found outside Southern Finland. Even there, however, the project risks have increased while conditions for investment have weakened. Central administration, environmental groups and nationwide media like to meddle with local disputes.

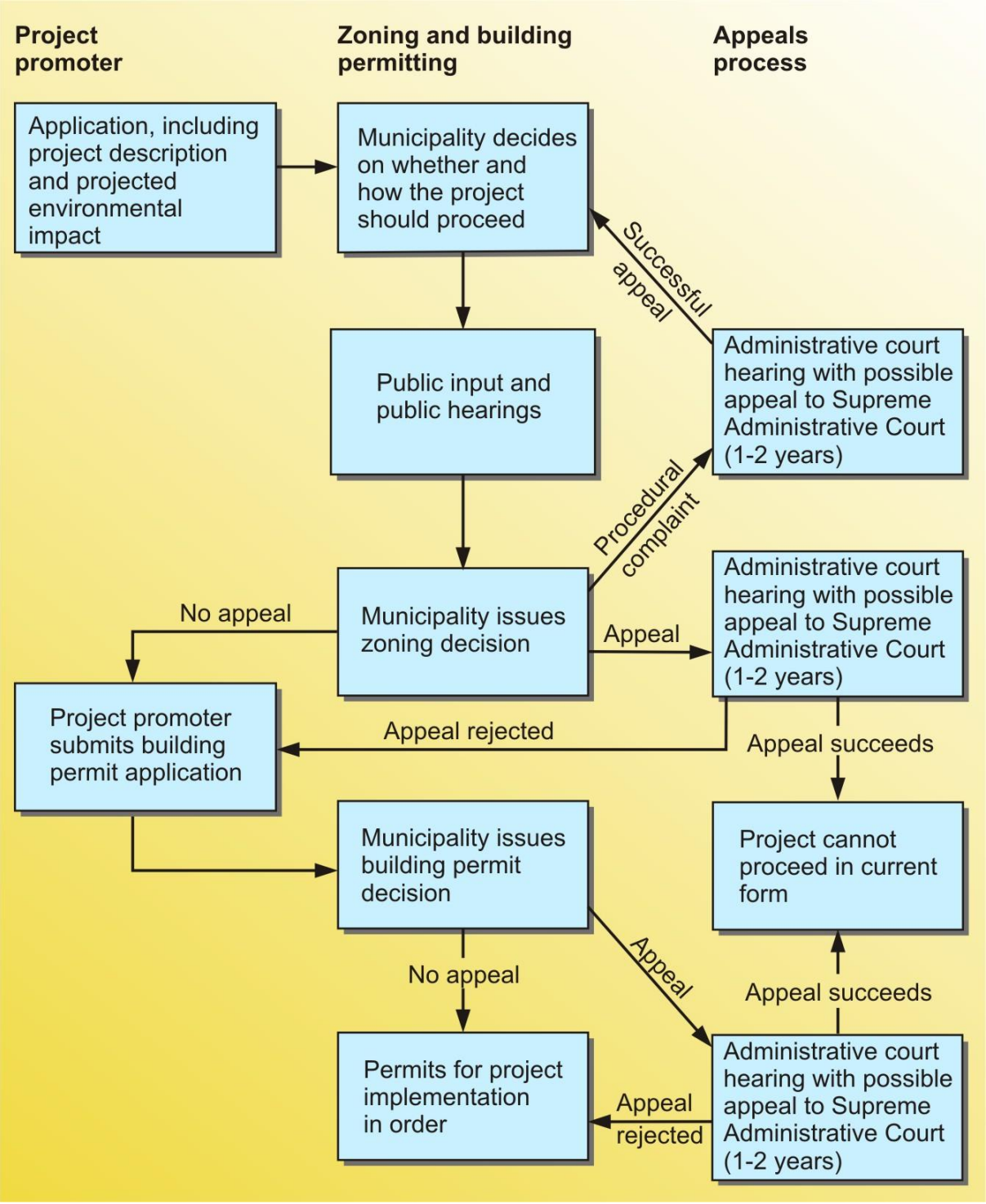


Figure 6.3. An example of the zoning and building permit process for a small offshore wind farm.

Changing operating environment

Traditionally, environmental permitting and laws have the benefit of conferring legal protection on projects and productive activities. When permits were in order and development of legislation was rational, there was a sound economical basis for operation.

The past decade, however, has seen a rapid evolution of environmental legislation and a concomitant focusing of attention on a wide range of vague or miniscule environmental risks. The official interpretations of rules have become stricter along with tighter demands on actors. This development has not been rational. It is sometimes impossible to predict what direction or form it might take.

In most industrial fields, capital investments were first directed within the plant gates, because greenfield projects carried more permitting problems. Gradually also these investments have encountered variety of bureaucratic obstacles even when providing net environmental gains.

Renewal of environmental permits has become a risk for plants or facilities. In this situation, excessive limits can easily be set on emissions and other impacts. Quite insignificant matters can be raised to the fore.

The UPM-Kymmene Kaukas mill waste water release discussed earlier provided an example of the problems facing industrial producers. In that case, the Ministry of the Environment demanded tightening of the permit conditions. The Southeast Finland environmental center issued a press statement /22/ saying that if everything does not go as planned, there could come a point when the mill would be ordered to close.

These tough positions are perhaps understandable for the perspective of those with summer houses who did not like the temporary nuisance of dirty water. The media and public debate bolstered the line of the officials. In any case, the officials have to possess means to see that the permit conditions are complied with.

The uncontrolled emissions in this case were exceptional and relatively minor compared to the situation only a few decades earlier. There was a slight exceeding of the permit conditions, and those affected were promised compensation. Moreover, the environmental damage was localized and transient. The impact of the emission on natural wealth and biodiversity was estimated to be just 0.6 km^2 eq. x year, which is comparable to the environmental impact caused by a few years of energy use by an average Finnish family (Appendix 3). There is a range of means including fines that can be applied to enforce permit conditions in a way that is proportional to the violation.

The issue of the one-sided decision to close the mill is not merely an environmental, but in fact a much broader social issue. In the following, therefore, we also discuss the implications of such a decision.

A prominent feature of the social debate has been the environmental criminal theme raised by the Finnish Environment Institute. Company directors, small operators and ordinary people are publicly labeled as environmental criminals without evidence of 1) actual harms to the environment or scale of damage or 2) recklessness or gross negligence. Charges of criminal behavior were leveled also in conjunction with the Kaukas pulp mill releases.

Often the criminal charge stems from a difference over interpretation as to whether a particular measure or activity requires a permit. A typical example involves the setting of a steel mooring structure in the Turku harbor area (see Figure 2.1). A local environmental official aroused a public outcry when he ordered a police investigation to determine whether an environmental crime had occurred since the mooring structure would have, according to the official's reading of the rules, required a water permit for its construction in the harbor. The Turku harbor's head engineer had to spend a considerable amount of time explaining to the police the finer points of the water act, the miniscule nature of the problem, and how the harbor construction permit process works in Finland. The matter was never pursued by the police, but the port's public image was stained.

When there is no will to include assessment of the relative significance of a particular problem by those setting environmental policy, those engaged in productive activities find themselves in a No Man's Land. The duties and open risks connected to productive activities have increased. If there is an intention to invest, a flock of people and public organizations resisting and making demands immediately descend on the promoter. This is fairly hostile treatment of those engaged in activities that benefit society as a whole.

Implementing EU directives

The implementation of the EU's regulatory framework in Finland has affected the status of business operators in many ways. The environmental administration's policy has been to interpret a given directive in its strictest sense, no matter what is its impact on local citizens. Thus, legal language itself can pose a threat to the industrial producer. In addition to the abundance of restrictions and regulations, statutes are vague or over-broad when they use such concepts as "best available technology" or "environmental permit valid until further notice".

The importance of productive activities for the society or legal protections of the administrative subordinates is not laid out expressly anywhere. When the regulation's practical application has been irrational or somewhat arbitrary, uncertainty has increased.

Surfing the EU Commission's website, particularly the DG of the Environment's web pages (EUROPA- Environment) quickly confirms that the flood of directives and legislation continues unstaunched, and the EU is preparing more new framework legislation to guide sustainable development and environmental issues.

In the time of this writing, it appears that that EU is defining how Finland should cut its carbon dioxide emissions. Furthermore, EU is also telling Finland how to produce energy. It is handing down targets for wave energy and bio energy production to its member country, for example. This is problematic in several ways.

Finland's base industries were adopters of advance environmental technology before the official cut-off date which defines their baseline emissions. Now they are forced to buy emissions quotas from competitors that would have shut down inefficient old plants anyway. Alternatively, Finnish firms can purchase industrial products from countries which are not participants in carbon-trading schemes. This kind of a development does not cut carbon dioxide emissions but weakens the European industrial base.

European Union has a rational base for its decision to start cutting carbon dioxide emissions. It may also have good reasons to push for the increase of its own renewable energy production. However, it is not in a position to make good decisions on how to achieve these goals. It would be much better to let member states and markets find their own ways.

The EU is developing an Integrated Product Policy (IPP) that considers the full lifecycle of products in reducing harmful environmental impacts. Unfortunately, there are no commonly agreed measures for dealing with harmful environmental impacts. Without objective measures, the policy runs the risk of capricious implementation.

Companies must also struggle with many inconsistencies in chemical legislation (REACH) and the new Environmental Liability Directive. These will cause additional headaches, increase open risk and higher costs. It is also problematic for firms when directives such as the Integrated Pollution Prevention Control (IPPC) Directive, the Large Combustion Plant (LPC) Directive, and the Water Framework Directive, are partly overlapping and contradictory.

The ideological approach to sustainable development promoted by Finland's environmental administration is also a cause for concern. The principles of sustainable development can be cited to hide all kinds of actions of power. Furthermore, when we have taken the initiative, Europe can easily boost its own self-image on environmental issues at Finland's expense in the very same way that Southern Finland seeks to boost its sense of self-worth at Lapland's expense.

From the standpoint of industrial and other productive organizations in Finland, the development of EU environmental legislation and its national implementation contains large hard-to-manage risks.

How industrial companies and other productive organizations adjust

The environmental policy practiced in Finland over the past decade has meant that industrial companies and other productive organizations have started to make a range of adjustments in how they operate. They have chosen not to fight openly for their rights, because they understand that a bitter fight with bureaucratic power usually makes no economic sense. At best little is to be gained. Continued harassment is more likely.

Instead they have changed their behavior.

If permitting processes are drawn out, expensive, and unpredictable, it raises the return-on-investment demanded by investors as well as raises the threshold for studying at all. When the payback on investments is plagued by higher open risk, ROI requirements and the threshold for investment are further increased.

In its national balance sheet accounting, Finland's Labour Institute for Economic Research found that investment by the corporate sector as a share of GDP had fallen over the past two decades from 25 % to just over 15 %. At the same time, the return on capital investment has risen to a record high, which in principle should have encouraged greater investment /45/.

This trend is not entirely unwelcome to large corporations. When unemployment rises, better quality workers and subcontractors are available and can be had at a lower price. If new production capacity is difficult to create, small, fast-moving competitors cannot enter the market and add to competitive pressures. Moreover, big companies can continue to use old production capacity, while raising prices and keeping their production capacity utilization high. The development of electricity prices in Europe and Finland are examples.

The restrictions of free competition provided by environmental bureaucracy may be partly behind the big profits of large corporations and extravagant bonuses for their bosses.

A large productive organization like the City of Helsinki does not necessarily mind the excesses either. The city lives from bureaucracy. If projects cost extra due to unreasonable criteria and demands, organizations and residents will pay it, not the city.

Large companies enjoy a stronger negotiation position relative to the environmental administration than small operators. They can play off local governments against each other by making a number of investment sites compete nationally or internationally. In this arrangement local governments seeking employment and tax revenues fight against the excesses of the environmental administration. Large companies also have resources to use experts well versed in environmental law. They have cultivated relations with many powerful politicians and public officials.

Large companies like to advertise their responsibility and environmental standards. They often participate in campaigns supporting some environmental goal. Corporate bosses routinely bring forward their green values in various forms in the media.

The success of multinational energy giants is based in part on the fact that their balance sheets can withstand the long public relations operations and uncertainties that accompany very large projects. When the time is ripe for one of the projects, they move ahead with lucrative terms.

When the legislation in Finland was clear, interpretation rational, and development predictable, industrial companies could be satisfied with ROI requirements for the project even below 10 %. In comparison, a ROI expectancy of 40 % is typical for investments in countries with inadequate investor protection.

Now large industrial companies have raised their minimum ROI requirement in Finland above 15 % in part to cover increased risk. Small and medium-sized enterprises are in weaker positions so their project ROI, in accordance with investment theory, should be even higher.

At the same time, the environmental investments demanded by officials depress the calculated ROI of projects, making them even less attractive. For example, the environmental detritus that burdened the Vuosaari harbor project such as a tunnel running under an "irreplaceable agrarian landscape," sound barriers, and TBT removal, added about €100 million to the cost of the project. Competing ports, meanwhile, faced environmental investments nowhere near this magnitude.

Corporate adjustment to the new situation means a reduction in feasibility studies and industrial investments in Finland, as well as an increased emphasis on community relations.

Finnish industrial companies are now investing mostly elsewhere. Their employment in other countries is rising rapidly while domestic employment has stagnated or turned into decline.

Public administration organizations that produce e.g. infrastructure and municipal technical services must also adjust to this new situation. They spend more on studies and public relations. Implementation of projects takes longer and is more expensive. Some of the most beneficial projects are never implemented.

The economic consequences of environmental policy

The remarkable recovery of Finland's economy after a bitter recession in the early 1990s was largely due to the phenomenal success of the Nokia Corporation after it decided to focus its efforts on the cellphone business. Nokia not only created 10,000 new jobs directly, its indirect impacts on employment domestically through subcontractors and support businesses translated into perhaps 50,000 jobs. In addition, foreign investors pumped over €30 billion into the Finnish economy as Finns holding Nokia shares sold them or enjoyed their growth and state collected increased taxes from Nokia and its employees.

The losses incurred from the banking crisis were recovered many-fold. The service sector bloomed again, real estate prices skyrocketed and the building boom in the greater Helsinki region resumed.

Nokia's rise was followed by economic booms in Russia, Eastern Europe and China. These booms have greatly benefited Finland's economy.

The above discussion considered the waste water emissions from the Kaukas pulp mill and the threat that the environmental administration would hut the mill down. The consequences of such unilateral action might have included:

- Over 2,000 workers at the Kaukas mill and perhaps 10,000 people working in the production chain, service industries and municipal sector would have lost their jobs.
- UPM-Kymmene would have had suffered large economic losses as a result of writing down a major industrial facility.
- The action being comparable to nationalization would have caused other investment projects under planning being put on ice due to the perception of increased open risk.
- The transfer of industrial activities to more profitable or less hostile operational environments would have accelerated.
- Finland's creditworthiness would have been damaged.

In fact, the risk that the Kaukas pulp mill would have been closed was not particularly large. The environmental administration was hardly ready to face legions of unemployed people or the rage of labor unions questioning the wisdom of such a decision.

Such action would have also exposed the state to hundreds of millions of euros in damages if the decision was found to violate the proportionality principle. This is the type of confrontation that gives companies a financial motive to get involved in a legal dispute. A multinational like UPM-Kymmene, can also go over the heads of the environmental administration and take its grievances directly to the prime minister's office if it feels that its core business is threatened.

What is unfortunate here is that UPM-Kymmene's operations are protected more by a balance of terror than the law.

UPM-Kymmene, however, still is in somewhat weaker position than the environmental administration in negotiating the terms of its permits, even if its emissions are at or below the European levels and its technologies comply with the best available technology standards. Environmental officials do not relate to environmental impact or risks according to the selected level of protection, rather they interpret and define the rules from their own premises.

Small and medium-sized firms, which lack the necessary expertise and social authority, find themselves increasingly at the mercy of the environmental administration both in their operations and in negotiating permit terms.

Companies do not like to have their investments at the mercy of anyone. They want rationality and legal protection for their operations. The current arrangement is bad for the economy and conflicts with the rule of law.

The laws of economics are uncompromising. If reform of energy industry structures is difficult due to burdensome and unpredictable permitting processes, such structures are reformed slowly. If industry's energy-saving investments carry a risk that a premature investment will later cause economic burden when emissions trade schemes are realized, such investments will be delayed. Carbon dioxide emissions go down slowly, the price of energy rises, dependence on imported energy increases.

Finnish industry is left without experience and references from the domestic market that it can use to develop new environmentally friendly energy technologies that could be applied also elsewhere. Thousands of people are left without work.

If the possibilities of the forest industry, the metal industry or the chemical industry to grasp emerging business opportunities are weakened due to long and unpredictable permitting processes and expensive energy, investments will be implemented elsewhere. If the operating environment develops unfavorably, existing production will also be moved elsewhere. Thousands more will be without work.

If harbor development becomes difficult and port operators are forced to dedicate resources to dealing with minor or nearly non-existent environmental problems, then their international competitiveness will suffer. Ports dwindle along with other productive activities connected to them. High harbor tariffs plague Finland's export industries. Thousands more will be out of work.

The new environmental policy has the following consequences:

- There are fewer opportunities to invest in developing the existing industrial base;
- The threshold to establishing new productive activity is raised;
- The development and competitiveness of Finnish technology suffers from a lack of concrete challenges and project references;
- The operational conditions of small and medium-sized enterprises are reduced;
- Some operators can shift the burdens of environmental policy on to their customers;
- Finland's traditional business life is losing dynamism and vitality;

- Employment in Finland's traditional industries and the cluster of supporting businesses diminishes;
- Weakening of the industrial sector reduces the number of good jobs available and the multiplier effect such industrial jobs provide;
- Hundreds of thousands of Finns will be unemployed or pushed into low-paid part time jobs.

Unfortunately, the China phenomenon is not just attraction of cheap labor and emerging markets. Finland and Europe are pushing productive activities away with both hands. Once something is lost, it is hard to get it back.

Bad times ahead?

As a result of environmental policies, the Finnish economy is losing dynamism, that comes from the flexibility, innovation and rapid response times. The need for permit that cover every aspect of industrial activity and the absurd jungle of regulation have increased costs and eliminated competitive advantage. Human efforts are increasingly being directed toward working with sector officials rather than development of know-how, business and products. The joy of work has been lost for many of us.

In this situation one should question the point of government efforts to promote jobs, innovations and new enterprises. Would it be more efficient to put people in the Ministry of Finance, the Ministry of Labor, the Ministry of Trade and Industry and the Ministry of Environment to work on this problem rather than investing taxpayer's money on this promotional work?

A hostile operating environment reduces the number of competitors large companies must deal with. Unfortunately, the lack of competitiveness also makes firms lazy. International competitiveness suffers.

Now that the telecommunications sector growth as stabilized, attention has shifted back to the state of Finland's traditional industrial branches. Mr. Markku Wallin, the highest civil servant at the Ministry of Labour forecasts that traditional industry will lose 100,000 jobs in the coming decade /11/.

We are supposed to be calmed by the notion of moving towards a post-industrial society that involves trade in information and services. The prevailing attitude in the environmental administration is that industrial production can be moved elsewhere. The mantra is that through greater investment in education and research we shall preserve and even foster increased prosperity for Finnish society.

Unfortunately, such thinking is built on a dangerous illusion. Information that has market value is usually generated in connection with real-world activities. Information generated by public administration research institutes, in contrast, is generally disconnected from real-world problems. When we are pushing productive activities elsewhere, we will find out that information with market value will follow production with a slight delay. As the economy weakens, there is no demand for the increased supply of service workers available – no matter how educated they are.

The EU environmental policy has provided the Finnish environmental administration an unreasonably powerful position in relation to those who produce value for the society. There is a danger that this will lead to a breakdown of society's structures with an intertwining of large corporations, political power and bureaucratic elites. In this arrangement, statutes and standards are bent to favor some and applied in other ways to harm others.

Such an arrangement can be found in some old European countries. Italy and Greece are of course at the brink of bankruptcy in the next recession. France and Germany are not far behind.

Guided by the sustainable development liturgy, Finland is now headed in a bad direction. Spiritual renewal has turned to manipulation, bureaucracy and arbitrariness. Our material, social and legal welfare are threatened. Fulfilling employment opportunities are getting rarer. The opportunities of individuals to build a future through productive activities have narrowed. If this continues, it will be futile for us to struggle to save our welfare state and our generous pension system.

We are being led to a bitter squeeze between the state bureaucratic power machinery and the economic power machinery of large corporations.

7. TOWARDS RATIONAL ENVIRONMENTAL POLICY

The current sociological process

The previous discussion argued that, aside from the risks posed by climate change, there are no environmental issues in the scale of war, economic collapse or totalitarian development threatening the well being of present and future European or Finnish generations.

There are environmental problems such as tiny combustion particles in some European cities and eutrophication of some Finnish waters. There are reasonable means to manage these problems. New risks may emerge for example in designer chemicals, nanotechnology, and gene technology, but there are reasonable means to manage risks in these rapidly developing areas also.

Overall, Europe's and Finland's eco-balances are good and improving in many areas from the situation just a few decades earlier. Yet there has been a flood of EU environmental strategies and directives covering all kinds of issues. This flood has been channeled into complicated and multiple bodies of regulation, along with the creation of burdensome administrative structures in Finland and elsewhere. Reason has been buried. Development of society has been unnecessarily shackled and weighed down by theoretical structures and bureaucratic interpretation.

Finns and most Europeans are again facing a strong sociological process that makes us feel guilt, restricts our freedoms and threatens our basic rights. Non governmental organizations, media, professional and scientific communities all looking after their own narrow interests and agendas have contributed to this process. However, it is the environmental bureaucracy establishment that has made the decisions. Furthermore, it may be the bureaucratic sector institutions and officials rather than their political masters who have gained the real power.

Michael Shermer /58/ has written about error, mistake and self-deception in connection of the American war policy in Iraq. He approaches the so called cognitive dissonance with an example of wrongly convicting people to death. People are lying in the court but you develop a theory of a crime that leads to so called tunnel vision. Years later overwhelming evidence comes out indicating that the convict was innocent. When faced with the choice that either the overwhelming evidence is wrong or you have made a fatal error, you tend to choose the psychologically easy way out by denying the evidence. That is where the error becomes a mistake.

The Bush administration's failure to admit errors in the Iraq policy has cost the American people dearly. But turning errors into mistakes is not limited to the Bush administration. It is an impartial part of human life. The environmental administration is especially prone to this problem, since this sector organization operates in a new territory in an ideological hubris pampered by urban media. It is not concretely accountable for its actions. Using public power and resources to defend erratic positions instead of admitting and correcting errors is a major sociological problem.

An example of an error and self-deception is the European Commission's response to its environmental policy critics stating bluntly that tough environmental policies are good for

European competitiveness. That may be so in the end if those policies have a rational basis. Ideological, excessive or simply stupid environmental policies are certainly not.

We are all responsible for our own and our children's futures. If we want to avoid a crisis, we need a new approach to environmental policy. The following discussion suggests some elements for this.

Rule of law, power and justice

It is generally thought that good governance and rule of law are prerequisites for freedom, justice and prosperity. Recent history of mankind supports this view. But what exactly is good governance or rule of law? There are no clear definitions.

There is no perfect world. Our basic rights should not be taken for granted. Justice is relative and depends on the point of view. The present governance and rules in the environmental sector are the creations of the bureaucratic elite. This creation carries several weaknesses including:

- The system is very efficient in churning out rules but not good at correcting its own errors;
- The jungle of rules builds up bureaucratic power while the legal protections of those engaged in productive activities have been forgotten. Bureaucracy decides in practice what law means.
- The system ignores people's tendency to meddle into other people's business and will to power;
- The bureaucratic establishment takes advantage of the fact that justice delayed is justice denied;
- The system has a desire to make a better world but in its egocentrism and political correctness it is not good in analyzing problems and it is even worse in solving problems.

The Permanent Secretary of the Finnish Ministry of Justice Kirsti Rissanen has focused on the flood of legislation. The ability of legislation to provide predictability and justice security is under threat of being weakened. Under her view we are facing a serious problem if citizens do not know what the law in practice expects on them /52/.

A larger problem still looms ahead if officials do not know or ignore what the law expects on them. When the Finnish ombudsman Riitta-Leena Paunio was told about the scale of the Vuosaari TBT issue, her reaction was: "I can't believe in this. It violates the principle of proportionality!"

Chapter 1, Section 2 of the Finnish Constitution states that exercise of public power must be based on the law. One should strictly obey the law in public activities. Now there is no more any dispute of the scale of tributyltin problems in connection of Finnish dredging projects. Yet not a single environmental official has been charged for violation of justice. Worse still, the unofficial guidelines are still used by the administration.

The president of Finland's supreme administrative court has focused on EU development in the context of threats to the national justice system /21/. He stresses the importance of

consistency between different levels of decision making. The Union should concentrate on strategic issues and stay away from minor or local issues. The key to this puzzle could be found from the development of subsidiarity principle by making off limits to areas where EU involvement is not needed.

The use of environmental details as power tools in international politics is getting more common. For example, a Finnish member of the European Parliament Lasse Lehtinen, has suggested that the environmental permitting process of the Nordstream pipeline should be used as a bargaining chip in the trade dispute over timber tariffs between Russia and Finland. While this is entirely possible, it degrades our justice system into a bargaining chip.

Environmental details are also used as domestic power tools as shown by the following example.

Case: Shutting down fur farms and the risk to groundwater

In 2002, the Finnish Council of State issued a decision in principle setting the targets for protecting water quality /72/. The decision was prepared by the ministry of environment led at that time by minister Satu Hassi representing the Green party. She is currently a member of the European Parliament. The targets included eliminating the groundwater pollution risks posed by fur farms.

The reasoning of the decision stated that the fur farms will be removed from ground water areas by the end of 2005. This meant that nearly 100 fur farms operating in important groundwater areas or other areas suitable as water sources were supposed to cease operations or move elsewhere. As of 2007, some fur farms had ceased operation, some had moved elsewhere and some had chosen to fight in the courts for their right to engage in fur farming under the existing framework.

Fur farms in Finland directly employ about 7,000 people. The industry, which is mainly owned by small Finnish entrepreneurs, generates export earnings in the range of €200–250 million a year. While the decision only affected certain fur farms, it was devastating to those particular businesses. Was this decision justified?

The facts show that one groundwater pumping station in Finland had been closed for five years due to contamination, mainly increased nitrate levels, caused by a nearby fur farm that had taken no steps to protect groundwater quality. There has probably also been other cases where uncontrolled fur farming has had an impact on adjacent groundwater quality.

On the other hand, groundwater supply build-up greatly exceeds groundwater consumption in Finland. The risks associated with fur farm droppings and urine can be easily managed.

A single fur farm has an average biomass of 20 tons (Figure 7.1), which means it generates about the same amount of excretions as 40 cows. If a plastic-lined basin filled with peat is placed under the cage sheds and emptied routinely in fields as a fertilizer, the size of the risk to groundwater is reduce perhaps as much as 99 %. The remaining 1 % is equivalent to the excretions of one moose calf or one person in nature. To be consistent, should we kill all the moose and enforce bathroom behavior on people moving around in groundwater areas?

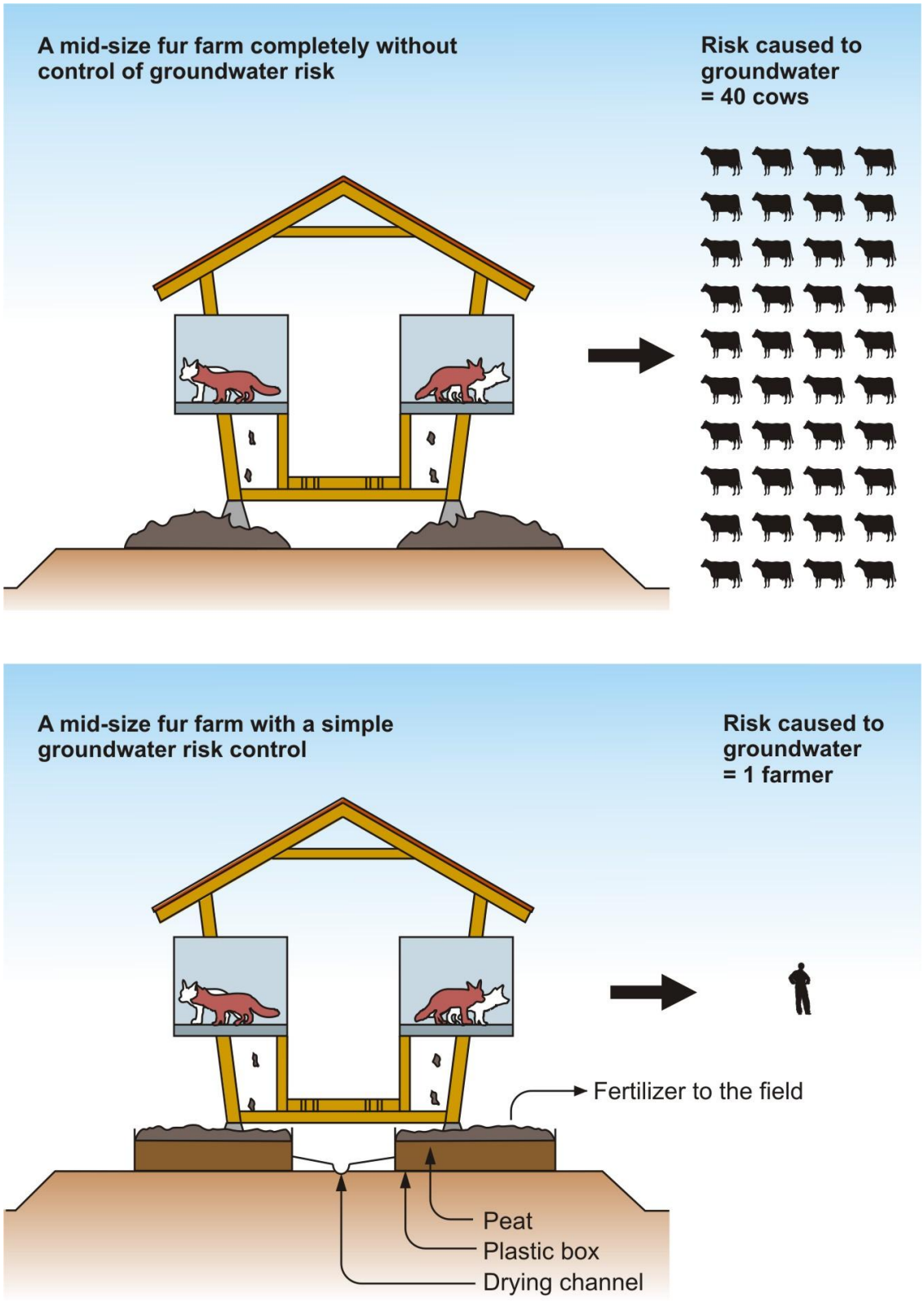


Figure 7.1. The size and management of risk to groundwater quality posed by a mid-sized fur farm.

The Council of State's decision in principle interfered in a fundamental way with right to property and the right to earn a livelihood. Even if the court process eventually provides the fur farmers full compensation, the ultimate result of the decision was deeply destructive to a segment of the rural population and rural society as a whole. It shook the foundations of the national economy and employment trends by reminding investors and entrepreneurs of the open risks of capricious decisions pushed by Finland's environmental administration.

Anyone can evaluate whether the decision to remove fur farms was proportional to the desired level of environmental protection or politically motivated aggression against a small segment of our society executed by a government ministry?

Some people think that fur farming is cruel. In a just society those interested in animal rights use animal protection legislation to advance their goals. Society protects basic rights of the people.

Do we want to build a system of oppression or a system of justice in the environmental sector? What could be done to make the system more just? Here are some ideas:

- There should be no use of power without real accountability;
- Those engaged in productive activities should be allowed to take care of their own business without unnecessary bureaucratic chains and submission;
- There should be less but better balanced environmental legislation;
- There should be clear hierarchies and priorities in legislation and in policies;
- There should be rationality behind every decision.

Above all we should be versed in fundamental matters, keep a sense of proportionality and focus on the essential.

Relative magnitudes of problems as a basis for decision-making

In considering any environmental issue, all parties involved (i.e. citizens, politicians, administrators and other public servants, productive organizations, trade and labor unions, NGOs and judges) should start by clarifying the following questions:

1) **What exactly is the problem?**
2) **How big is the problem?**
3) **What is the benefit of a given measure relative to the size of the problem?**
4) **What is the whole price of the measure in the society and who are supposed to pay it?**

In defining the problem we deal with impacts and risks, not guideline values or interpretation.

It is usually not difficult to establish the relative size of an environmental problem or risk. We have cultivated the land, built cities and infrastructure, developed an industrial base and endured two world wars. This provides us with perspective for assessment. Emissions can be compared with emissions legacy and current trends. Impacts and content levels can be considered in terms of natural phenomena and reference cases. Many risks are easy to size by studying decades of experience from reference cases.

The presented pallet of methodologies provides one basis for environmental impact comparison. Calculations are easy to understand. Anybody can calculate the relative impact of a problem and draw a conclusion. Unlike today, where black box, manipulation, emotional reactions and impressions play a role in defining the perception of a problem, here analysis and calculation is the foundation.

The magnitude calculations should be sensitive to new information, respect the arguments raised by others, and allow for comparison of calculations to better understand the basis of the problem. In the best cases, everyone's values will fall within the same order of magnitude.

If there is a significant environmental problem, there is usually a range of measures to manage the problem. In addition to prohibitions and limits one can take active measures to treat or contain the problem or compensate the damage for example by restoration elsewhere. It is possible to put all options on the table with their benefits, drawbacks, risks and price tags. Then one can make a cost benefit analysis /12/.

The question of price is, however, much larger than just a prize tag. Direct costs are usually easy to estimate and the primary payer to identify. As shown above, each action has a reaction, which may, for example, extend to the competitiveness, employment, carbon dioxide emissions, living conditions and basic rights.

In principle, the handling of the above issues should be a natural part of each party's checklist in considering various options. In practice, this has not happened nor has there been any desire to make it happen. The task is, however, rather simple as we can see in this example of protecting flying squirrel habitat.

Case: Protection of flying squirrel habitat

Flying squirrel is in the EU Habitats Directive Annex II, which lists animal and plant species of community interest whose conservation requires the designation of special areas of conservation and in Annex IV which lists animal and plant species of community interest in need of strict protection. The decision to put flying squirrel in the latter list meant among other things that deterioration or destruction of flying squirrel breeding sites or resting places is prohibited without a tightly guarded special permit.

At the time of the decision, the small circle of its bureaucratic and political creators were well aware that the main habitats of flying squirrels are located in the Siberian taiga and Finland lies at the extreme edge of the range of flying squirrels.

Flying squirrels keep several nests and resting places. Their young go out into the world to establish new home territories. A female home territory is usually less than 10 hectares. The males range over much wider area that may include several female territories. Flying squirrels are not especially picky of their habitat. They need hollow trees or man made nests and thrive in rather rich forest with conifers and deciduous trees. Sufficient tree density is necessary for the squirrels to move from tree to tree.

Finns have been told that at the time of the decision officials believed on a flying squirrel population of about 40,000 breeding pairs. It was also assumed that the flying squirrel population had diminished by about a fifth during the previous decade due to loss of habitat.

The officials in charge of EU habitats directive could have assessed the consequences of flying squirrel protection by a simple comparative analysis of three available strategies:

1) Highest protection strategy (placing the flying squirrel on both Appendices II and IV)
2) Flexible protection strategy (placing the flying squirrel only on Appendix II)
3) Flying squirrel does not need additional protection measures

The following illustrates how the costs of these strategies can be estimated and what could be their other implications. The estimates look at a bureaucratic risk rather than the eventual outcome or official explanations.

We assume that the area of forests in Finland suitable as flying squirrel habitat is 2 million hectares. Whether or not some of this forest is already protected is not considered. Moreover, in estimating the costs below, we make no distinction as to private or state landowners, because the price to each is the same.

Highest protection strategy	**Flexible protection strategy**	**Present forestry practices**
Increase in protected land area A = 0.2*2,000,000ha = 400,000ha Area using special forestry methods A = 0.8*2,000,000ha=1,600,000ha	Increase in protected land area A = 20,000ha Area using flexible methods A = 1,980,000ha	Area of protected land unchanged New forestry practice standards remain in place
Flying squirrel population in the long term 400,000ha/25ha/p + 1,600,000ha/ 40ha/pair = 60,000 pairs Eco-balance in the long term +4,000km²*5% +16,000km²*2 % =+520km²	Flying squirrel population in the long term 20,000ha/25ha/p + 1,980,000ha/ 45ha/pair = 45,000 pairs Eco-balance in the long term +200km²*5 % +19,800km²*1% =+208km²	Flying squirrel population may recover somewhat by improved forestry practice Eco-balance in the long term +20,000km²*0.5 % =+100km²
Financial cost Protected areas (state taking at fair market price) 400,000ha*€6,000/ha= €2400 million Lost economic profits from protection 400,000ha*€100/(ha*year)= €40 million/year Special forestry practices 1,600,000ha*€40/(ha*year)= €64 million/year Additional infrastructure development costs €20 million/year	Financial cost Protected areas (state taking at fair market price) 20,000ha*€6,000/ha= €120 million Lost economic profits from protection 20,000ha*€100/(ha*year) = €2 million/year Flexible forestry practices 1,980,000ha*€10/(ha*year)= €19.8 million /year	Financial cost No additional costs besides those from using new forestry methods

The highest protection strategy assumes that 20 % of the protected forest is set aside exclusively for flying squirrel habitat and that special forestry practices are used in the remaining forest area.

The strict strategy would not only benefit flying squirrels, but also preserve old growth forest and increase biodiversity in Southern Finland. This comes at a steep price, however. The investment costs alone would be €2.4 billion and the annual costs for the different parties including costs to society due to increased costs of building infrastructure and communities would exceed €100 million.

The strict strategy also has a high social price. Forestry is an important source of income for the Finnish rural population. The strategy interferes with people's right to earn a living and use their own property. It also chains the right of local communities to decide on their own development.

The flexible protection strategy assumes that the flying squirrel population and biodiversity is already largely protected under the Natura 2000 program, other existing protected areas, and new forestry practices. The measures for society's development could be implemented in a deliberate fashion, but damage to the flying squirrel population could be compensated through conservation measures and other actions elsewhere.

The third strategy acknowledges that Finland has developed new forestry methods that respect local ecological values. As the flying squirrel is not even vulnerable in the Western Palearctic region, population range shifts at one edges of the distribution area does not justify the use of EU power.

Based on the above analysis, one could have asked:

1. How much money are the EU and the Ministry of the Environment prepared to commit to preservation of flying squirrel habitat and how much are others supposed to contribute?
2. Is there any intention to compensate the rural people, property owners and municipalities for their losses?
3. Is the strict protection decision possible without informing the EU and Finnish parliaments of all consequences?

In the end, the decision was to apply the most draconian regime possible, with no-one taking responsibility for what happened subsequently.

As an example of the consequence, consider the construction of the stretch of National Highway 1 between the towns of Muurla and Lahnajärvi (a distance of about 50 kilometers). Approximately 50 flying squirrel home territories were discovered within 500 meters of either side of the proposed path of the highway that were threatened either by degradation or destruction. As a result, the planned path of the highway was moved so that only one flying squirrel home territory was likely to be destroyed (i.e. the flying squirrel would have to move elsewhere) while four more territories would be degraded.

The project was implemented with a special permit. Moving the path of the highway added about €10 million to the cost of constructing the highway segment. Thus, the value of one flying squirrel home territory to society here exceeded € 200,000.

Based on the 2003 – 2005 count by the environmental administration there are about 143,000 female flying squirrels in Finland (for some reason the total population has not been estimated). The population could be further strengthened by installing man made nests just as has been successfully done in Finland to the Ural Owl population. The annual cost of this kind of a positive approach could be € 100,000.

There is not and never was any justification in putting the flying squirrel into the EU habitat directive. It was smuggled in to promote other goals. The fact that it still is in the directive shows that the bureaucratic elite does not want to surrender power capital back to administrative subordinates or face accountability for its own actions. The elite put its own interests and problems above those of European people and justice.

What to do with the bureaucracy?

Enron and Skandia are well recognized symbols of corporate malfeasance. These companies ceased to pursue their long-term interests when their top management sought its own short-term economic benefits. Economic restructuring swiftly solved the messes.

Government bureaucracies can not go bust even if they do more harm than benefit the society. If we want to break the burden that the environmental administration is piling on the society we need a new approach.

Improving the operating climate and legal protections of productive organizations, entrepreneurs and property owners offers perhaps the least expensive way to bolster the economy. One rapid way to return confidence on the justice society would be to pay state compensation to victims of the most egregious transgressions on the part of the environmental administration. Errors in the use of public power would be confessed in a concrete manner.

The money should come out of the funding of the environmental administration. The message would thus reach also those in the administration whose will to power has overwhelmed their duties as civil servants.

The roots of the problems, however, lie deep in bureaucratic structures, culture and social-psychological health. As a matter of fact the great opportunities connected to European cooperation are being buried by bureaucratic excess. In the present setting the process of bureaucratic power may become more of a threat to the well being of European people and nations than an opportunity.

Thus extraordinary measures are called for to manage the bureaucracy problem. They could include:

1) Information guidance
2) Capital guidance
3) Linking power and accountability
4) Reforms in permitting agencies and courts
5) Structural reforms
6) Overhauling the environmental policy approach, legislation and governance

Information guidance means that any decision-making process governing environmental issues begins with the fundamental questions:

1) What is the problem?
2) How big is the problem?
3) What are the alternative approaches of managing the problem?
4) What are the benefits they offer and what is their full cost in the society?

This analysis should be public.

Environmental issues range from local issues that some people would like to have at the expense of others to international issues that may shape the future of mankind. Thus there should be priorities and hierarchies when we deal with environmental issues and they should be related to other goals in the society.

At the EU-level one could start with its waste policy with the theoretical waste definition. What is the waste problem and how big is it? What is the benefit of the policy and what is its bureaucratic burden to European people? What is its carbon balance with the centralized facilities? What would happen if EU decided to prioritize cutting greenhouse gas emissions (including methane emissions from landfills) and left the European countries, organizations and people to deal with their waste as they see reasonable?

Private sector approaches to dealing with environmental problems offer huge cost saving potential. Those should be given a chance in any serious effort to improve the environmental conditions.

Case: How to deal with eutrophication of the Gulf of Finland

People in Southern Finland feel very strongly about the eutrophication of the Gulf of Finland or more exactly the algae problem that is occasionally visible at summer cottages and beaches. The algae problem is a result of nutrients in the water mass. Nutrients originate from human as well as natural sources. However, a big part of the problem is a result of so called internal loading.

Internal loading means that after biological activity has consumed all oxygen from the bottom water layer, phosphorus is released from bottom sediments to the water mass as a result of chemical and biological processes. This loading is large, 5 tons/(year x km^2) has been cited /47/.

In chapter 4 we discussed the decision of forcing Finnish rural households and summer cottage owners to invest 5,000 to 10,000 euros each or a total of 2-3 billion euros on new waste water treatment facilities. Operation, maintenance, repair and replacement costs as well as medical costs of those getting infections from the new facilities will add to this burden.

The decision was sold to the political decision makers with the sound bite “untreated wastewater of a million people” and reference to EU water policy. Somehow the proportions of the problem were lost. The annual external phosphorus load on the Baltic Sea is of the order of 30,000 tons and the internal load may be of the order of 100,000 tons. Considering

that the nutrients tend to stick to soil particles, the contribution of Finnish rural households and summer cottage owners is probably cut by 10 – 100 tons with the new facilities.

Lakes suffering from eutrophication caused by internal loading have been treated by circulating oxygen rich surface water to bottom by pumping. This same idea has also been suggested for treating the Baltic Sea. Some people in Finnish state expert institutes have ridiculed this idea by claiming that it would require 20 nuclear reactors. The supporters of the idea have orders of magnitude lower power need estimates.

In any case, bottoms suffering from the lack of oxygen in the Gulf of Finland should be quite easy to treat using air bubbling (Figure 7.2). The method is very efficient in causing huge water circulations with a reach in kilometers. It has been proven technology for half a century. Applications include pneumatic oil barriers and ice control systems (see for example /42/).

A few removable systems like this have the potential of eliminating phosphorus from circulation in the Baltic Sea with three orders of magnitude better cost efficiency than by forcing rural population and summer cottage owners to invest new waste water treatment systems. Private sector research and development efforts and experimenting would certainly find even better and more cost efficient methods to handle the eutrophication problem if there were financial incentives.

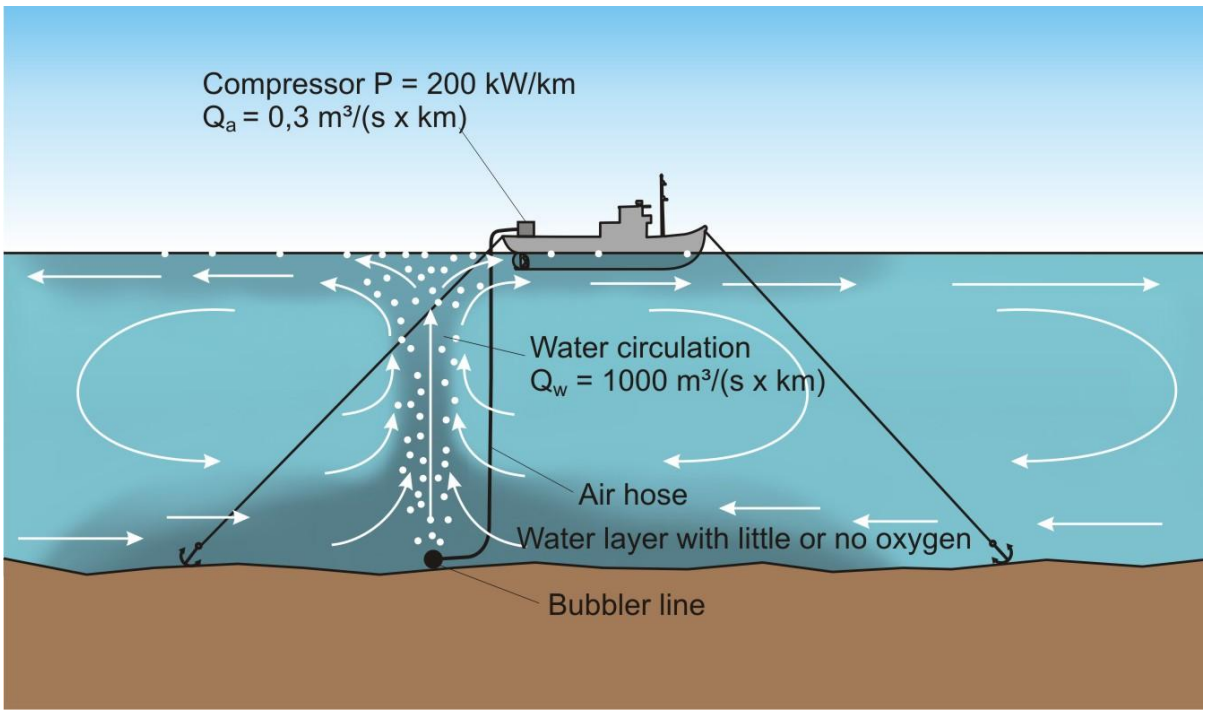


Figure 7.2. Eliminating internal phosphorus load from the bottom with a removable bubbler line.

Agriculture is the main external source of nutrients from Finland to the Baltic Sea. It is also an important industry for our food security and exposed to international competition. Only a small fraction of rural wastewater release sources have significance. These release sources should be obvious to any serious expert in the regional environment administration.

Thus information guidance approach to the eutraphication problem could yield the following result:

- Focus on measures to eliminate internal loading;
- Focus on ways to cut agricultural nutrient load,
- Encourage public private partnership and experimentation to improve the cost efficiency of problem management;
- Manage 5 % of the presently most significant rural household nutrient sources by administrative measures;
- Provide information on typical problems and reasonable solutions to the rest;
- Provide incentives for rural households and summer cottage owners to invest the saved 2 billion euros into measures that cut greenhouse gas emissions like energy renovation works.

Perhaps in the future we may find ways to turn the eutrophication problem into an opportunity. It may be possible, for example, to use algae for energy production and nutrients now stored in the bottom sediments for agricultural purposes.

This brings us to the next policy question. What is the point of the EU policy trying to define best available technology? Bureaucracy is not well suited to do this. It serves us much better when it focuses in a professional manner on problem management and on investing in our environment. Private sector is much better in finding cost efficient ways to reduce impacts and to handle problems.

Consider now the case of Finnish central environmental administration pushing for tight city structures with shopping centers located within the reach of public transportation citing ecological reasons. How much is such policy supposed to cut carbon dioxide emissions with the present energy production structure? What is the savings potential when the slow pace of community structure change and the changes in energy production profile are considered? What is the cost to the people, when the property market is artificially squeezed by tight zoning? How does this kind of Big Brother policy relate to people's right to live and work where they want and to rights of municipalities to decide on their own future with zoning decisions?

Wouldn't it be much simpler just to cut carbon dioxide emissions with prize hikes starting from those areas were gains are easiest to achieve and let the society find its own solutions and form? This approach would also allow us to react on new information and international developments in a timely manner.

Information guidance helps to control bureaucratic excess in several ways:

- In forcing the bureaucracy to quantify issues it also helps to it see priorities and hierarchies;
- It opens ways to innovations and better cost efficiency in dealing with environmental problems;

- It forces the administration to think about the broad consequences of the decisions;
- Quality of decision preparation improves, because manipulation of numbers is easy to point out;
- The decision maker has a sounder basis for the decision than in the present sound bite approach;
- When the justification of decision includes numbers and cost benefit analysis, there is less need for administrative guidelines and less room for arbitrary interpretation;
- When facts change as they tend to do with time it will be easier to alter the decision:

Unfortunately a bureaucracy determined to defend its positions will find ways around this kind of information guidance. Thus also stronger measures are needed.

Capital guidance means that the environmental administration uses its own capital resources to pay for the consequences of its actions. It is now far too easy for the sector administration to conclude that its own mission is so important that others have to submit and pay.

Consider the case of eutrophication. If the environmental administration were to pay half of the cost of managing waste water releases from rural households and summer cottage owners, the cost would be cut by 95 %. Much more cost efficient approaches and methods would emerge by necessity.

This is off course against the polluter pays principle invented by the bureaucracy. However, blind fate on this principle ignores proportionality and distorts justice. After all, the rural population plays a vital role in the society by providing us food security and other essential products and services.

Thus, if additional preservation of old-growth forest is important, environmental administration would have to pay for redemption of land through state action. If the administration feels that the concentrations of harmful substances are somewhere at alarming levels, it should participate in financing remediation works. If an abandoned industrial facility should be protected because of its cultural historical value for the society, the administration should buy it and take responsibility of its maintenance and development. If the administration wants to interfere with the renovation of a building it should also shoulder the additional costs.

In a just society this kind compensation should be automatic and not behind a court battle or an application for compensation from limited funds.

Financial guidance does not suit to all sectors of environmental administration. There are protections that we must have. Furthermore the European Union does not have the money to participate in financing its environmental policy in a meaningful manner.

In politics and civil administration there are no limits in the will to power. Thus there is a need to define another form of capital, i.e. power capital. This would measure the extent of power a bureaucratic cluster is allowed to impose its own will upon behavior of people and other organizations. It could be comparable to financial capital and there should be limits on both.

Good leadership usually requires sacrificing something for the greater good. Here, capital guidance would help in differentiating important environmental matters from less important ones and reinstate cost-efficiency as an important public goal.

This kind of an approach would also promote the development of real expertise in the environmental sector with international market value.

The linking of power and accountability should be self evident in public administration. After all officials are not mindless drones, but exercise considerable public power within broad limits in a modern society.

Why does this not work? There are several explanations including:

- Administrations are divisions in the struggle of political power, and politicians do not voluntarily surrender power;
- The environmental administration possesses vast resources and numerous ways of defending its own positions and power;
- Permanent posts in the administration enjoy strong legal protections;
- The thought of firing bureaucrats is anathema in European societies;
- The justice system seems to be toothless when facing a strong sociological process and expansion of power capital of the environmental sector is a strong sociological process.

One method politicians and bureaucrats use to weaken the link of power and accountability is to use ideology, sound bites, principles and interpretations of theoretical legal structures to justify the decisions. At the same time analysis of potential problems and risks connected to those decisions is purposefully dropped. That way it is harder to figure out, who actually meant and decided what. A vague reference to the principles of sustainable development is a buzz slogan to groundless use of power.

However, ideological madness and the abuse of public power will gradually take its toll. When problems accumulate and people loose their jobs there will be room for enforcing this link.

We have a right to demand justice. We have the right to demand that a clearly understandable and proportional basis is written for every decision. We have the right to demand consequences if the basis is wrong or misleading and those decisions turn out to more harmful than beneficial.

If the private individual or company is expected to know the law, it seems only fair to expect the same from public officials. Bending of rules and making lawless guidelines, regulations or demands should actually be punished under the law. People who use their public positions to harass administrative subordinates should go.

Thus in every legal conflict between the environmental bureaucracy and an administrative subordinate the court should consider not only compensation but also how the bureaucratic institute and individual bureaucrats are punished, if the bureaucracy looses.

Reform of permitting agencies and the justice system largely involves finding ways to speed up the permitting process. If appeals or complaints are seen as an official duty and frivolous complaints and appeals are treated as a fundamental right, then at least the courts should work to handle these cases in a reasonable time. After all permitting agencies and courts are supposed to provide justice. Now the length of the permitting process is used as a tool of power.

It is quite feasible to handle the entire permitting process, including appeals through all levels of the court system, in a year, as was well demonstrated in the permitting of the Hartwall ice hockey arena in Helsinki. This should be guaranteed.

Procedures to speed up the permitting and court processes could be developed. For example, much of the current paperwork could be replaced with a face-to-face interview. The justification for the project, as well as the basis for complaints has already been stated in the permit application. A serious expert needs a week to write up a statement for the court. The time of shuffling paper through mail could be cut at the age of the internet.

If the possibility to use the length of the court process to exercise power over the permit applicant is taken away, court case load will drop. If there are consequences in filing groundless appeals, court case load will drop further. If a private party files a baseless appeal, this party should be liable at least to the reasonable court costs of the permit applicant. If a public administration files a baseless appeal, it should be accountable as stated above. Perhaps such simple measures would cut the case load to those of merit and to guarantee a six months time ceiling for the possibly two rounds of appeals without additional resources.

The justice chancellor is supposed to be the highest guardian of legality of the use of public power in Finland. However, this position is undermined by the fact that public power nominates the chancellor. Perhaps we should elect the justice chancellor by direct vote at the same time as we elect the president. This would give the chancellor a better standing in prosecuting politicians and firing civil servants abusing their power.

The composition of the administrative courts both in the EU and in Finland should also be reconsidered. These high judges must today deal with conflicting regulations, interpretations and goals. Their decisions guide the permitting and governance at the local level.

From the standpoint of the administrative elite it is quite convenient that they come from the public sector almost without exception. But does this put theoretical structures and administration's internal values, attitudes, and ways of thinking at an advantage? Would a balanced background of judges and court experts serve the people and the cause of justice better?

One aspect of environmental policy, legislation and governance is striking in the EU as well as in Finland. Much of what has been created in the name of environmental values seems to assume that society has no other values at all. The politicians and bureaucrats powering the administration have created it from their own perspective and given themselves the greatest possible latitude.

Why isn't the vital contribution of productive activities to our society stated clearly in policies and statutes? Why isn't the legal status and rights of property owners and project promoters laid out in clear language? Where is the proportionality? The average bureaucrat

or citizen has trouble understanding the superior legal structures that are now supposed to govern these matters. What average citizens don't understand, opportunists are fairly free to exploit.

Structural reforms are natural features in the life private organizations. So those should also be considered in the case of administration. If something does not work it needs to be fixed.

The basic problem lies in the difficulties that an elite organization has in dealing with errors. Consider the case of Galileo Galilei whose scientific thinking conflicted with the official view that earth was the centre of the Universe. He was forced to admit wrongdoing and punished by the Catholic Church in 1633. It took more than 350 years for the Catholic Church to officially admit that Galileo had indeed been right and the Church wrong. This happened in 1992.

Now let us consider once more how environmental legislation in the EU is created. An isolated elite of political actors and sector bureaucrats talk together and interact with lobbyists, urban media and public institute experts far from the realities of ordinary Europeans. Then they make policies, legislation and decisions. The problem is that the system assumes these acts to be nearly perfect and to stand time.

People and organizations make errors. The European Union is engaged with several ideological and risky environmental policies. The outcome of these policies may turn from intended benefit to heavy burden to the European people if this system failure is not fixed. Europe can not afford to look as errors are turned into mistakes until crises hits.

One way to do this would be to split the European Parliament and Commission both into two parts, one located in Brussels and the other one in Strasbourg. The new entity would have the sole power to overturn policies, legislation and decisions, but no power to create these. It would have the duty to follow the outcome of legislation and governance, to protect subsidiarity principle and to keep legislative and bureaucratic excess in check. It would have its own expert organizations providing critical reviews of scientific evidence, administrative decisions and policy outcomes.

At the national level the review of legislative outcome could be given to the justice ministry.

More balanced environmental policy and legislation drafting might also emerge if the Ministry of the Environment would cease its operation as a sector administration. Its tasks could be split between the Ministry of Social Affairs and Health, the Ministry of Agriculture and Forestry, the Ministry of Employment and Economy and the Ministry of the Interior.

In this setting environmental policy would be a part of a larger policy and governance. The situation Finland enjoyed a couple of decades ago would be reinstated. If people representing Finland in the EU environmental policy meetings were changed and policy targets reviewed, the environmental administration's advancement of its own agenda through the EU would end.

The issue of balancing the benefits to society and the possible harms should be raised also in any permitting process. An administrative intention to interfere should be handled first, e.g. at a Regional Employment and Economic Development Centre before any demand or appeal

is made that could endanger a project or activity. Under this scheme, demands and appeals would originate from the official collective rather than one sector official.

Overhauling the environmental policy approach, legislation and governance is required both in the EU and in Finland to improve social justice, strengthen employment and to secure the well being of our present and future generations. The next European economic crises will be partly a result of EU environmental policy decisions. It will test the very existence of the Union.

Europe in crises can't solve many problems but it has to dig into the roots of the crises to solve the basic problem. This may turn the crises into an opportunity. The schematic diagram of Figure 7.3 suggests some key elements of the overhaul. The process would start from reviewing the existing environmental legislation and overruling everything that causes more harm than benefit.

Then comes the patching work. The objective is less but better focused and balanced environmental policy, legislation and governance. Decisions are prepared based on an analysis that is public. People and those involved will be free to express their views during the preparation stage and on the preparation outcome. Furthermore, the decision maker orders an independent expert review on the preparation outcome. Then there is a political decision.

After the decision there will be an independent follow-up of the outcome. This increases the accountability of the preparation organization, reviewing expert and decision maker. If the outcome is not desirable the decision is overruled with a buffer time period that may be needed to fix problems or change course.

So what is new? There is an analysis instead of a sound bite or ideology. There is an independent follow up of the outcome that increases the accountability of the preparation organization, reviewing expert and above all the political decision maker. And finally there is an independent system for overruling the decision.

In the private sector this kind of constant follow-up, re-evaluation and adjustment is not only good governance. It is the condition for survival.

If the politicians and bureaucrats in Europe are serious about promoting the goals stated in the second article of the treaty of Rome, they could consider improving the legislation and governance by exposing it and themselves to an independent follow-up and overruling body.

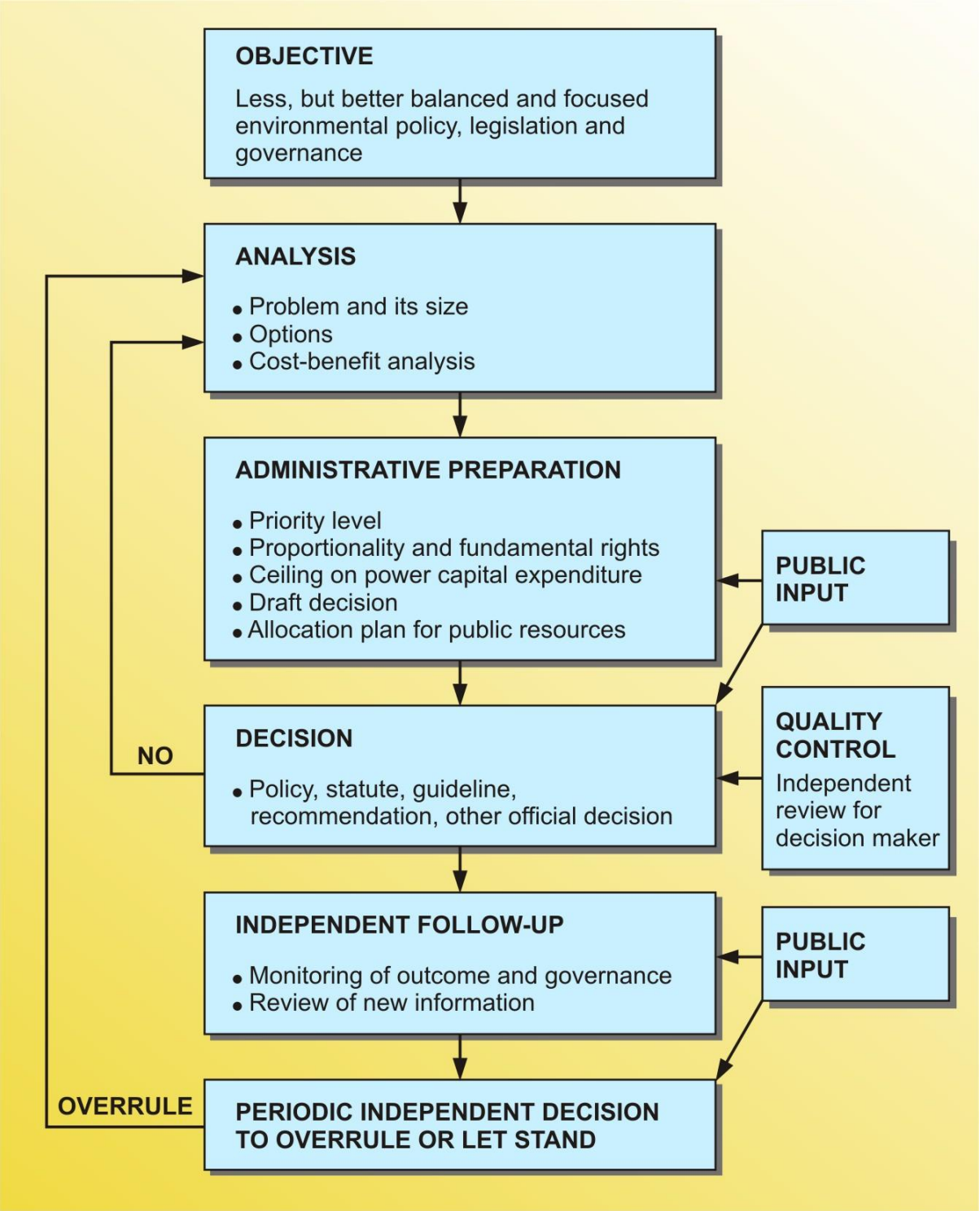


Figure 7.3. Overhaul of environmental legislation and standards.

Imagine the opportunities of rational environmental thinking

Imaging a situation where

- Environmental legislation and governance is clear, effective, focused, and proportional to other values of the society;
- The handling of environmental impact assessment process, permit issues or zoning changes takes a maximum of six months, and once the decision is made the legal appeals process would be limited to another six months;
- Rational analysis is an integral part of the decision-making on environmental issues;
- There are limits and accountability in the use of power;
- The emphasis in nature conservation shifts from protection of individual habitats, plants and animals to protecting biodiversity at a larger scale;
- Society focuses on environmental issues by husbanding its resources for the most important environmental problems and risks and making substantial environmental investments on its own.

In practice, shifting to this new regime would marshal society's efforts to confront and solve the serious problems Europe will face in the near future. Getting rid of bureaucratic excess would free resources for handling the challenges of ageing population, climate change and perhaps even for helping Africa in dealing with its multiple problems in an efficient manner.

If Finland succeeds better than other countries in channeling the flood of environmental directives into a rational and functional body of environmental legislation and governance, the perception of Finland as a justice society will be strengthened. This is a fundamental issue for Finnish society and economy. Both the national competitiveness and social well-being will improve.

If we can deal with real and significant environmental problems rapidly, rationally and cost-effectively, we will not only reap the environmental benefits ourselves, but also gain expertise and develop products for which there will be demand internationally.

As an example, consider the evolution of the energy sector. Although at this point we still lack certainty about the extent of climate change and how changes will emerge, the risks involved are huge. There are also other compelling reasons for reducing our dependence on fossil fuels, including:

- There is a need to diversify our energy portfolio for strategic reasons.
- Reduced dependence on Middle East oil and gas supplies would reduce the region's threat to global stability.
- Oil and gas are resources that are being rapidly depleted.

Finland can build its energy future through rational development of e.g. nuclear power, bio-energy, wind power, improved energy efficiency, hydropower, extraction of heat from the ground with pumps and heat exchangers, and perhaps even hydrogen technology and carbon capture. If we keep the development in our own hands, people's lives will not change much nor will our basic industries be threatened.

Other European countries have similar options available and can develop their own energy portfolios. Jeffrey Sachs /56/ has presented some views on how the threats of climate change could be tackled in a global scale.

The task ahead is considerable. The price will be paid in higher energy costs and also environmental impacts. If we build, e.g. more hydropower to deal with peak demand, this has local impacts on nature as well as on its use. However, the impacts are small compared to the risks of climate change. Thus we should prioritize this issue and proceed rapidly.

Development of new technology, construction of production capacity and energy infrastructure and new energy production involves significant challenges for the energy industry, the electrical and electronics industries, the metals industries, and the construction industries. If we operate at the forefront of the energy evolution, new technology is created. This may mean new economic locomotives and well being. This may also mean important contributions in solving the climate change problem in the global scale.

Rational environmental thinking offers huge opportunities, plenty of meaningful work, and real improvements in our quality of life. Why shouldn't we put our illusions and will to power behind us, and break the shackles of old attitudes, manipulation and direction from above? Why shouldn't we begin to deal with environmental matters using basic arithmetic and our own common sense?

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APPENDICES

APPENDIX 1: DEVELOPMENT OF THE NAANTALI HARBOR

Project description: The project to develop the Naantali harbor originally involved 1) expanding the harbor by creating a dock in the northwestern part of the harbor and dredging soft sediments in the fill area (about 70,000 m^3 in the development plan), 2) construction of a new dock in the Luonnonmaa harbor area including filling works and dredging the local clay mass (about 310,000 m^3) and 3) deepening of the channel to the Turku repair dockyard and dredging out a basin to accommodate a floating dock (planned mass to be dredged approximately 180,000 m^3). Dumping of the dredged masses was to take place at the previously used dumping site, a deep area at the center of the harbor water area. Part of dredging of the channel to the repair dockyard and dredging of the area below the floating repair dock (altogether 57,000 m^3) was completed under an existing dredging permit so that dockyard employment would not be disrupted.

Original 1994 project cost estimate: 7 million euros (including docks), of which about 0.2 million for the dredging that was completed under the existing permit.

Planned project start: 1996

Permitting phases: Harbor development plan and negotiations 1994–1995

Submission of application for water rights permit in accordance with dredging plan: May 8, 1995

Agreement with the West Finland Environment Centre on sediment sampling and studies: Nov. 7, 1995

Sediment sample studies completed, Feb 2, 1996

Decision of Western Finland Water Court (considering ten claims and demands): Aug. 28, 1996

Permit is granted for the dredging operations as planned.

Petitions on decision were filed with the Appeals Court for Water Issues. There four appellants: 1) the Southwestern Finland Environment Centre, 2) the City of Turku Environmental Protection Board, 3) the Turku Rural Board of Commerce, and 4) representatives of the fishing areas around Airisto. Grounds for appeal: need for additional studies, determination of levels of the hazardous substances PCB and DDT and its derivatives (based on interpretation of the HELCOM dumping guideline). Appellants 3 and 4 also sought a hike in their compensation for damage to fishing areas near the harbor. The Appeals Court largely upheld the decision of the West Finland Water Court in its decision of June 19, 1997

The City of Turku environmental protection board, The Southwestern Finland Employment and Economic Development Centre and the representatives of the Airisto fishing area sought to appeal further to the Supreme Administrative Court. To get a hearing, they requested from the Ministry of the Environment a statement on their initial grounds for appeal and further appeal. The Ministry issued its statement on Nov. 23, 1998. The statement included a

separate statement from the Finnish Environment Institute. The Finnish Environment Institute's statement called for the Supreme Administrative Court to issue an injunction to prevent commencement of dredging operations until studies that it considered necessary under the HELCOM dumping guideline could be completed. The Supreme Administrative Court granted a temporary injunction on Nov. 26, 1998.

Part of the channel dredging and the dredging of the basin under the harbor floating dock was done under the existing dredging permit between Dec. 4, 1998 and Apr. 30, 1999 on the basis of a negotiated agreement with the harbor and the Southwestern Finland Environment Centre. The Southwestern Finland Environment Centre at the behest of the Finnish Environment Institute, however, added new terms to the existing permit's requirement of a dredging follow-up study by also calling for studies on the content of PAH compounds, tin compounds, and organotin compounds in sediment samples as well as a study of the currents around the dumping area.

On Aug 15, 2000, the Supreme Administrative Court returned the matter of the new permit to the West Finland Regional Environment Center noting only that the Water Court had failed to clarify the impacts of TBT and PAH compounds on the affected areas, the extent of the impact and the suitability of the dumping site.

Permitting costs through 2000

Expert statements on plan and procedures: 40,000 euros

Water studies, including monitoring and reports, required by environmental officials: 30,000 euros

Fishery studies: 35,000 euros

Costs to the City of Nantaali and harbor for permitting process and study oversight (including repair dock): 85,000 euros

Total: 190,000 euros

Needs and circumstances change, harbor and city scale down the project

Western Finland environmental permit office grants permit for maintenance dredging of 50,000 m^3: Apr. 5, 2004.

The Southwestern Finland Environmental Center and the fisheries unit of the Southwestern Finland Employment and Economic Development Centre file complaints on the new permit.

Vaasa administrative court grants dredging permit on Oct. 5, 2006

APPENDIX 2: AN ASSESSMENT OF THE VUOSAARI TBT PROBLEM

Basic information about tributyltin

Tributyltin (TBT) was widely used earlier as a biocide additive to ship paints to prevent the formation of barnacles and other sea life on the hulls of ships. This kind of antifouling paint maintains a smooth layer over the surface of the hull. This decreases friction allowing the ship to move more efficiently through the water, and thereby reducing CO_2 emissions.

Finland abolished TBT use for small boats and large trade vessels years ago. However, the elimination of TBT has been problematic with ships that move in tropical waters. Due to the lack of effective substitutes, TBT use continued in ocean going vessels. International Maritime Organization members in 2003 agreed to ban TBT, and the TBT paints have been removed from ship hulls or painted over by the start of 2008.

When organotins are released from the paint on the ship's hull, they bond with suspended particles in the water. In the Netherlands, researchers found that TBT released from ship hull and attached to sediment particle had diminished bioactivity. The measured toxicity was two orders of magnitude lower than TBT in solution.

The half-life for TBT to degrade typically varies between two weeks in a normal water environment to six months in sediments. In an anaerobic sediment layer, however, the half-life rate of TBT degradation can slow to 5–20 years/59/.

Discussions on assessing bottom sediment quality typically concerns limits on hazardous substance content or levels at which hazardous substances become problematic for the environment. One common threshold is 5 %, that is, the level at which the hazardous substance impacts 5 % of a given ecosystem. Thus, if a lake's sediment is contaminated at this level, 95 % of the lake's ecosystem is still safe. In the Netherlands, the 2002 permitted limit value for total content of organotin compounds was 250 µg /kg dry weight (d.w.). TBT is usually the dominant organotin component in marine sediments. Thus the limit corresponds to about 600 µg/kg d.w of TBT.

TBT in Vuosaari sediments

Organotin levels exceeding the German and Dutch limits were found in Vuosaari surface sediments (top 10 cm layer) in 2003 measurements over an approximately 20-hectare area. This area had been occupied by a stationary dock and a floating dock in the 1970s and 1980. Later the facilities had been used as a repair dock yard.

Further away from the floating dock the surface sediments had TBT levels around 50 µg /kg d.w., in other words 10 % of the limit value.

Most of the TBT was found in a two hectare area that had been deepened for the floating dock. The sedimentation in this kind of a depression is faster than in the surroundings. Here high TBT concentrations were found also in deeper sediments. Maximum TBT-concentrations exceeded limit value by more that one order of magnitude.

Sand blasting of ship hulls had piled paint particles on the dock and these had been released to water from both ends of the floating dock during dockings.

The TBT levels found in Vuosaari were, in fact, typical for such areas. TBT levels in harbors globally have a range of 10–2,000 µg /kg d.w. /59/. In dock areas and small boat harbors, the TBT levels may have been locally distinctly higher. TBT content in sediments under busy channels are also elevated. For example, the typical TBT levels found in surface sediments in the North Airisto channel are in the range of 50–100 µg TBT/kg d.w. /10/.

The Helsinki harbor's own estimate for the total TBT content of Vuosaari sediments was about 100 kg. For purposes of comparison, estimates from the 1990 suggest that Dutch docks released about 5,600 kg of TBT a year and the maritime TBT emissions into Dutch waters at that time were about 17,800 kg a year /14/. In the Rotterdam harbor alone the TBT emissions were estimated at 1,097 kg/year and the amount of TBT stirred up by dredging was put at 451 kg a year/59/.

Based on the above description, it is clear that the TBT content of the sediments was essentially a localized problem near the dock area. The problem was apparently not very serious as it was not noticed during the time the dock was in more intense operation and when the environmental effects of TBT in the Vuosaari dock area were much greater than in 2003.

What does standard dredging and dumping do to the sea bottom?

Dredging is underwater earthworks. If the seabed is locally contaminated, good dredging practices call for dredging away the surface layer first and then covering it later with virgin seabed material dredged from below. The dredging mass is normally placed on a sea bottom subject to natural sedimentation area or used as fill material in the harbor construction works. Heavily contaminated sediments are usually encapsulated, sometimes brought ashore and transported to special landfills and sometimes stabilized in harbor fills.

The end result for areas of dredging and dumping activity is always the same, however – a cleaner seabed. The biologically active surface layer is replaced with a clean new surface layer in the dumping area. TBT degrades undisturbed below the dumping area. Thus, a standard dredging procedure already would have largely eliminated the environmental problems in the vicinity of the Vuosaari dock.

Dredging and dumping operations inevitably generate a certain amount of suspended solids. The press, chose to describe the dredging disturbance in the Vuosaari harbor as a "poisonous cloud". The suspended particles stirred up by dredging and dumping activity typically linger for about a day or less moving with currents before they settle out on the seabed. Particles getting suspended near the bottom settle out quickly. Thus a large part of the suspended material settles in the immediate vicinity of the dredging or dumping activity.

In normal backhoe or grab dredging, up to 5 % of the mass is suspended in the water column. When the dredging mass is dumped down at the dumping site from a barge, the amount of solids suspended in the water is about 5 % of the total mass in the case of soft, fine sediments.

In a standard dredging operation, about 10 kg of the 100 kg of TBT in the Vuosaari sediments would have gone into suspension. Most of this would have been eventually buried in the dumping area.

Because the total mass to be dredged was about 5 million m^3, the average TBT content of suspended solids that would have settled elsewhere would have been low, about 2 µg /kg d.w. i.e. well below the background TBT content. Furthermore, as the surface sediments would have been dredged first, the TBT containing sediment particles would have been covered with clean material.

The environmental impact of suspended solids compared to emissions from maritime traffic

In the following, we first attempt to put the dimensions of the suspended-solids issue in perspective. We take direct comparison points from the figures for Dutch sea traffic.

Reference /59/ assumes TBT emissions of 0.04 g per day for each square meter of tin-painted ship hull. This means that the emissions for a typical ocean freighter would be about 200 grams a day. The 1990 maritime TBT emissions in Dutch waters were estimated at 17.8 tons/14/. In that year, Dutch harbors had 45,000 calls. This works out to an average TBT emission of 0.4 kg per call.

Assume sediments containing TBT are dredged and dumped using standard methods for six months. The operation releases an average of 0.4 kg of TBT a week into the water mass (mostly attached to suspended solids). This amount corresponds to the emissions from 25 harbor calls of sea freighters, i.e. about one harbor call a week during the dredging operation.

In recent decades, Finland's harbors averaged 300–400 calls from foreign traffic ships every week, with the Helsinki harbor alone having 60–70 calls. Most of the calling ships had hulls coated with TBT-antifouling paints. In the last ten years, while ship traffic has increased, TBT use on ships hulls in the Baltic has declined.

The poisonous cloud

Most of the Vuosaari TBT was located in and around the sides of the repair dock excavation. How much of a poisonous cloud was actually stirred up during dredging of Vuosaari sediments? We consider here the worst case of removing 10 kg of TBT a week using normal dredging and dumping methods.

As a point of comparison, consider the Elbe River delta in the Hamburg area and downriver. This is an approximately 400 km^2 area, where the suspended solids in the water mass average 50 mg/l. Due to higher turbulence in the Freiburg-Gluckstadt area, the suspended solids level in the water can be an order of magnitude higher /36/. The average organotin content in Elbe River delta suspended solids has averaged 600 µg/kg for many decades /10/.

In the case of the Vuosaari dredging mass, the average organotin levels in the area of the repair dock were an order of magnitude higher than this. The organotin content in suspended solids in the dredging and dumping areas, however, drops to under 50 mg/l within a few

hundred meters of the repair dock area. In other words, at its worst the water quality corresponds to water in the Freiburg-Gluckstadt area during the few weeks of floating dockyard depression dredging in an area of approximately 10-hectares.

No particular health problems or eco-catastrophes have been reported from the Elbe River delta, where TBT has long been present.

The poisonous cloud in the Vuosaari case was comparable to the emissions of an ocean-going vessel. At the most intense phase of the operation, the amount of TBT in suspension added to the local waters from the dredging and dumping operation would have amounted to about 1 kg of TBT a week. At the time of the project execution a similar level of emissions would have been given off by a moderate sized RO-RO freighter legally anchored at the Vuosaari harbor.

TBT's effects on human health

The average organotin content in Vuosaari fish averages 20–50 μg/kg. The European Food Safety Authority (EFSA) estimates that a person can safely consume an average of 0.25 μg of organotins per kilo every day. In other words, a 60-kg individual could eat without risk about 400 grams of Vuosaari fish every day. Finnish per capita fish consumption is about 30 grams a day. Moreover, the EFSA recommendation includes a 100-fold safety factor /51/.

The maximum amount of alcohol a 60-kg person can consume daily without risks to health works out to an average of two12-cl glasses of wine a day. This figure does not include any safety factor. If, for example, the fisherman's wife consumes an average of 400 g of Vuosaari fish every day of her life, the impact, considering the safety factor, would still be smaller than if she enjoys a glass of wine once a month.

The TBT levels in fish can be assumed to decline rapidly with the elimination of ship hull emissions. If there is a need to immediately lower the TBT levels in fish, the fastest way to achieve this is to make extensive dredging of shipyard and sea traffic areas. In this respect, the Vuosaari dredging operation was quite effective.

Helsinki harbor solution

Guided by the demands of the environmental administration, the harbor officials decided to dredge the sediments containing TBT inside an extensive curtain that contained the suspended solids. The most problematic masses were temporarily placed in a rock excavation. The final dumping site of these sediments was a contained bay. The sediments were covered by granular fill and became part of the harbor field.

The solution completely eliminated the dispersion of TBT in the harbor area. Helsinki harbor officials report that these special measures added about €10 million to the construction costs. The damage caused by changes in the project execution and schedule are hard to quantify.

APPENDIX 3: MAGNITUDE ESTIMATES FOR VARIOUS TYPES OF ENVIRONMENTAL IMPACTS

Collision of a very large asteroid with the Earth

The collision of a massive asteroid over 10-km in diameter with the Earth would put up a huge dust cloud in the atmosphere that would block out the sun and cause a prolonged winter planet-wide. It has been suggested that a massive asteroid impact near the Yucatan Peninsula 65 million years ago wiped out the dinosaurs along with most other surface life. Natural wealth and biodiversity took tens of millions of years to reemerge.

We start by converting the Earth's surface area to equivalent surface area in terms of significance multipliers:

Area type	Surface area	Multiplier	Equivalent area
Fertile soil	100 Mkm²	3.0	300 Mkm² eq.
Deserts	50 Mkm²	0.5	25 Mkm² eq.
Continental shelves	50 Mkm²	1.5	75 Mkm² eq.
Deep oceans	300 Mkm²	0.33	100 Mkm² eq.
	500 Mkm²		500 Mkm² eq.

We then assume that the event has a 95 % relative impact on dry land, 85 % on the continental shelf areas and 60 % in the deep oceans. Thus, most land-based species vanish.

The recovery of natural wealth and biodiversity is slow at first, then accelerates an slows down again when a new balance is approached. If we assume that recovery is linear takes 30 million years, we get an estimate of environmental impact for the Earth of:

$I = -0.5 \times 30{,}000{,}000 \text{ years} \times (0.95 \times 300{,}000{,}000 \text{ km}^2 \text{ eq.} + 0.95 \times 25{,}000{,}000 \text{ km}^2 \text{ eq.} +$

$0.85 \times 75{,}000{,}000 \text{ km}^2 \text{ eq.} + 0.60 \times 100{,}000{,}000 \text{ km}^2 \text{ eq.}) = -6.5 \times 10^{15} \text{ km}^2 \text{ eq.} \times \text{years}$

Full-scale nuclear war

The number of declared nuclear weapons is presently about 13,000, with a total destructive force on the order of 5,000 megatons. While the destruction power of explosions in an all-out nuclear war would be massive, it would still be limited. However, it will be followed by the nuclear winter induced by clouds of radioactive dust and smoke thrown up from the explosions and subsequent conflagrations. The ozone layer, which protects surface life, would be severely damaged. Models suggest that the nuclear winter would be followed by a nuclear summer, when the average planetary temperature would be boosted by about 10°C.

The environmental impact scenarios for all-out nuclear war are discussed in detail in references /57/ and /53/. The impacts are strongest in continental areas of the northern hemisphere. Because the seas possess such large heat capacity, they would to some extent protect narrow bands along the coastline from the extremes of temperature fluctuation.

Although these scenarios involve great uncertainty, they form the basis for the following environmental impact scenario.

Most of mankind and most surface life would be destroyed as a result of violent climate change, radiation, and the damage to the ozone layer. We assume life would spread gradually from the least damaged areas back into the worst affected zones. On the other hand, many significant species would go extinct, so the recovery of natural diversity could take millions of years. For the sake of rough estimation, we divide the impacts into two parts.

If we assume that 70 % impact on dry land, 50 % impact on the continental shelves and 30 % impact in the deep oceans, and the reoccupation of damaged areas takes 2,000 years, we calculate an environmental impact for the Earth of:

$I = -(0.7 \times 300{,}000{,}000\ km^2\ eq. + 0.7 \times 25{,}000{,}000\ km^2\ eq. + 0.5 \times 75{,}000{,}000\ km^2\ eq. +$

$0.3 \times 100{,}000{,}000\ km^2\ eq.) \times 0.5 \times 2{,}000\ years = -3.0 \times 10^{11}\ km^2\ eq. \times year$

We assume that the disappearance of species has a long-term environmental impact of 20 % on the land, 10 % on the continental shelves and 5 % in the deep oceans (double the amount of species) and the return of biodiversity through evolution takes 4 million years. This would give an environmental impact estimate of:

$I = -(0.2 \times 300{,}000{,}000\ km^2\ eq. + 0.2 \times 25{,}000{,}000\ km^2\ eq. + 0.10 \times 75{,}000{,}000\ km^2\ eq. +$

$0.05 \times 100{,}000{,}000\ km^2\ eq.) \times 0.5 \times 4{,}000{,}000\ years = -1.5 \times 10^{14}\ km^2\ eq. \times years$

Extinction of species is a more important factor in this calculation estimate than the repopulation of the destroyed area. We may further note that the loss of complete families of species such as the dinosaurs takes much longer to replace through evolution than the replacement of a single species.

Climate change

These calculations assume that the IPPC climate change predictions and descriptions of consequences are roughly right.

If the temperature change is small (2°C), people and nature would experience limited changes in their living conditions. A large temperature change (5°C) would not only have a large environmental impact in itself, but also escalation of cumulative and combined effects of famine, forced migration, wars, anarchy, melting of ice caps, ocean level rise, and collapse of entire ecosystems. There may be surprises after some thresholds are exceeded like additional release of greenhouse gases to the atmosphere.

We estimate the maximum impact range for the 2 to 5 °C climate change as follows:

Area type	Equivalent area	Relative change	Change in eq. area
Fertile soil	300 Mkm²	-0.02 … -0.4	-6 … -120 Mkm²
Deserts	25 Mkm²	+/- 0	+/- 0
Continental shelves	75 Mkm²	-0.02 … -0.2	-1.5 … -15 Mkm²
Deep oceans	100 Mkm²	-0.01 … -0.1	-1.0 … -10 Mkm²
			-8.5…-145 Mkm²eq.

With a minor increase in the temperature (2°C), the environmental impact is assumed to develop linearly for about 100 years and then recover in a linear fashion over another 100 years.

The environmental impact is -8.5 million km² eq. x 0.5 x 200 years = -850 million km² eq. x years

A large temperature increase (5°C) inflicts long-term damage. Damage build up is assumed to occur in 200 years and recovery is assumed to take place gradually after cooling has started, which means that a new natural balance is established after about 2,000 years.

Here the environmental impact is -145 million km² eq. x 0.5 x (200 + 2,000) years = -160,000 million km² eq. x years

If the temperature increase of one degree Celsius has a multiplier effect of 5.7, the greenhouse effect in the basic scenario would be -5,000 million km² eq. x years for an average worldwide rise of 3°C.

Due to the polar amplification phenomenon, the average temperature in Northern areas like Finland would increase about twice as much. In tropical areas the average temperature rise would be correspondingly smaller.

Partial destruction of tropical forests

In countries at or near the equator such as Brazil, Nigeria, Indonesia and in Central America, tropical forests have been extensively cut and cleared. The area of tropical forest continues to shrink, with particular concern over the loss of Amazonian forests often characterized as the "lungs of the planet". Tropical forests feature exceptionally rich and diverse ecosystems.

Let us assume that over a century, 4 million km^2 of virgin tropical rainforest is converted to farm land, lost through commercial forestry or destroyed e.g. by drought. This loss corresponds to about a third of the world's tropical forests. Ecosystems suffer worst in areas where the forest is destroyed entirely or broken up into a patchwork of forest islands. If the forestry practices are managed, on the other hand, natural diversity could even increase.

We further assume that natural wealth and biodiversity would reemerge gradually in 500 years in also the most damaged areas as a result of re-plantation and proper management or by letting the area to remain undisturbed for a period of 500 years.

We assume that most of the destruction occurs in high value tropical forests, to which we assign a multiplier value of 10 in recognition of its ecological significance. Roughly, the loss of natural wealth and biodiversity is 50 % of a 2 million km^2 area. This gives an environmental impact of:

I = -2,000,000 km^2 x 0.5 x 10 x 0.5 x (100 years + 500 years) =

-3,000,000,000 km^2 eq. x years

Historical footprint of Finnish agriculture

Finland practiced slash-and-burn farming as late as in the 18th century. This ancient practice involves cutting and burning the forest, crop cultivation, use of the land as pasture land, reforestation and a new cycle of slash and burn. In the 19th century, the agricultural focus of Finland shifted to the clay soils of Southwestern Finland where field cultivation with crop rotation was introduced.

The population increased in a fairly linear fashion from the beginning of 1600s (around 300,000) to the beginning of the 1800s (800,000). By the start of the 1900s, Finland's population had risen to 2,600,000 and by the year 2000 it had reached 5 million. Due to the gains in agricultural productivity, the area of land under cultivation remained unchanged throughout the 1900s at around 30,000 km^2.

It appears slash-and-burn farming had little impact on natural wealth and biodiversity in sparsely populated areas. Increased biodiversity compensated for the loss of natural wealth. The effects of slash-and-burn practices and field cultivation on natural wealth and biodiversity have been limited mainly to the areas where agriculture dominated and replaced most of the existing plant and animal life. Animal husbandry has both positive and negative environmental impacts. On this basis, we determine the environmental impact of agriculture (not counting the effects of fertilizer use) for 100-year increments starting from 1600:

I = -5,000 km^2 x 0.2 x 3.0 x 200 years – 10,000 km^2 x 0.2 x 3.0 x 100 years –

15,000 km^2 x 0.2 x 3.0 x 100 years = -2,100,000 km^2 eq. x years

Accident at Chernobyl nuclear power plant

The accident at the Chernobyl nuclear reactor in 1986 in Ukraine led to a reactor explosion, fire, and the atmospheric release of large amounts of radioactive materials for a period of ten days. Over 100,000 people were evacuated from areas near the accident site. 31 power plant employees and rescue workers were lost due to acute radiation exposure. While a large share of radioactive emissions degraded quickly, there is still today a measurable increase in cesium-137 concentrations in soils far from Chernobyl, including in Finland. The half-life of Cs-137 is about 30 years /38/.

Generally, the Chernobyl nuclear accident only contributed a marginal amount to the natural background radiation. Its impact on human mortality in the heaviest fallout areas was at least

one order of magnitude lower than deaths due to cigarette smoking, fossil fuel use or medical X-rays. The relative magnitude of these deaths is discussed in references /44/ and /66/. Farming and fishing, however, are still restricted in certain contaminated areas as food products tend to concentrate radioactive materials and their radioactivity may exceed permitted limits /38/.

In assessing environmental impact, we divide the areas affected into the 30-kilometer protection zone, areas where cesium isotope fallout exceeds 600 kBq/m^2 and areas where the cesium fallout is in the range of 40–600 kBq/m^2. For the purposes of comparison, we give normal land surfaces a radiation value 300 kBq/m^3, which, of course, varies in nature.

Within Chernobyl's 30-kilometer protection zone, there are today no extensive signs of the accident's environmental impact. In fact, wild animal populations have increased substantially as people have been banned from the area. The accident site includes a 4 km^2 forest area destroyed by extremely heavy radiation exposure. The site also includes a dump for radioactively contaminated materials. The environmental risks of the radioactive materials over the long-term are concentrated in this area. The contamination of the area is quite heterogeneous, but the average fallout in the area exceeds 1,500 kBq/m^2.

Considering the half-lives of various isotopes, the area will need to be closed to people for 100 years (emphasizing here the significance of the human contribution to natural wealth and biodiversity, we assign an environmental impact of p = 20 %) and a recognition that the accident has had both direct and indirect impacts on natural wealth and biodiversity (p = 2 % average), we estimate an environmental impact of:

I = -3.14 x 30 km x 30 km x 3 x 0.22 x 100 years = -200,000 km^2 eq. x years

Outside this area, the fallout exceeded 600 kBq/m^2 over an approximately 10,000 square kilometer area and was locally up to an order of magnitude larger. The effects of such levels on agriculture (and to some extent the wealth and diversity of surface life) last for about 100 years. With an initial impact of 1 % the environmental impact estimate would be:

I = -10,000 km^2 x 0.01 x 3 x 0.3 x 100 years = -10,000 km^2 eq. x years

The fallout was 40–600 kBq/m^2 in an area over 100,000 km^2 in the former Soviet Union and also areas where rain precipitated radioactive fallout in parts of Austria, Switzerland, Germany and Scandinavia. If the heaviest fallout came down in an area of 25,000 km^2, the effect lasts 30 years and the impact on natural wealth and biodiversity is 0.1 %, we get an environmental impact of:

I = -25,000 km^2 x 0.001 x 3 x 0.5 x 30 years = -1,000 km^2 eq. x years

The total environmental impact in this case is more than -200,000 km^2 eq. x years. Much of this comes from the weighting given to the evacuation of the protection zone.

Eutrophication of the Gulf of Finland (assumed recovery time 100 years)

The Gulf of Finland has experienced powerful nutrient loading for more than five decades now. There has always been a significant nutrient load to the Gulf of Finland from natural sources. Recent nutrient load increase originates from farming activities, natural sources, municipalities and industry, traffic, energy production and industrial smokestack emissions. Nutrients may also enter with currents from the Central Baltic Sea. The nutrient loading has started to decline recently.

As on land, nutrients in the water increase plant growth. The increased biological activity, in turn, consumes oxygen in the water, leading to "dead zones" in areas of high biological oxygen demand. Today, large swaths of the bottom of the Gulf of Finland are oxygen-starved or "dead". In this situation the so called internal loading emerges. Nutrients are released back to the water mass from surface sediments as a result of chemical and biological activity.

Nutrient availability contributes to the appearance of massive blue-algae blooms in summer, increased turbidity, reed growth near shorelines and increased sedimentation. All these factors to some extent influence the Gulf of Finland's ecosystem.

We give the Gulf of Finland an importance value of 1.5. The relative environmental impact of eutrophication is assumed to be 10 % on a 5,000 km^2 area, 4 % on a 10,000 km^2 area and 1 % on a 15,000 km^2 area. The time that it would take various parts of the Baltic to recover to a preindustrial condition is assumed to average 100 years. The estimated environmental impact would be:

$I = -(5{,}000\ km^2 \times 0.10 + 10{,}000\ km^2 \times 0.04 + 15{,}000\ km^2 \times 0.01) \times 1.5 \times 0.5 \times$

$(50\ years + 100\ years) = -120{,}000\ km^2\ eq. \times years$

The 1991 Persian Gulf War (including oil spills)

After Iraq occupied Kuwait, a coalition of UN-sanctioned international forces from 34 countries entered Kuwait and pushed the Iraqis back across their border in the Persian Gulf War. The main effects on natural wealth and biodiversity were the result of:

- Aerial bombardment and missile strikes
- Ground operations
- Destruction of oil fields and oil infrastructure

Military sources report that during the course of the Persian Gulf War about 220,000 bombs and missiles were detonated, of which about 200,000 were unguided bombs dropped mainly in the desert on Iraqi troops, and 20,000 were guided missiles and smart bombs used in surgical strikes against military targets or infrastructure. The total destructive force of these weapons was purported to be around 100 kilotons.

When an approximately 500-kilo bomb is dropped on flat desert with sparse vegetation, the pressure shock severely damages plant roots and most animals over a broad area. For the sake of discussion, we assume here that the destructive force of a bomb on natural wealth and

biodiversity over a one hectare area is 50 %. We further assume that strikes also have reflection effects (such as disturbance effects and the release of hazardous substances into the environment) to which we assign a multiplier of 1.5. If the importance factor for desert is 0.5, and other areas carry a multiplier of 3.0, and the gradual recovery of natural wealth and biodiversity is assumed to average 10 years, the estimated environmental impact from bombing and missile strikes in the desert is:

$I = -1.5 \times (200{,}000 \times 0.01\ km^2 \times 0.5 \times 0.5 + 20{,}000 \times 0.01\ km^2 \times 0.5 \times 3.0) \times 0.5 \times 10$ years

$= -6{,}000\ km^2$ eq. x years

While most people avoid the areas of unexploded cluster bombs, they constitute a huge danger to Bedouins who must move through the area. Assuming cluster bombs are buried within a 2,000 km^2 desert area, the environmental impact for unexploded bombs is 2 % and the average period of impact is 50 years (impact unchanged), we estimate the environmental impact at:

$I = -2{,}000\ km^2 \times 0.02 \times 0.5 \times 50$ years $= -1{,}000\ km^2$ eq. x years

Ground operations involve the setting of mines and artillery shelling. Dozens of divisions were mobilized and heavy tanks and vehicles damaged vegetation in the area. The operations also left behind large amounts of waste and wreckage, which even today has only partly been cleaned up.

The Iraqis are estimated to have set about 500,000 mines, mostly in the vicinity of Kuwait City and along the Saudi Arabian border. As long as the mines remain active, minefields and their immediate surroundings must remain closed to people and large mammals. While the mines and other explosives in Kuwait have been removed in inhabited areas, we can still assume Kuwait has active mine fields in the desert covering a total area of about 10 km^2. If the relative environmental impact of an active mine field is 25 %, and the period of active danger averages 40 years (the impact over the period is unchanged, until the mine fields are cleared or mines become inactive), the environmental impact of setting mines would be:

$I = -10\ km^2 \times 0.25 \times 0.5 \times 40$ years $= -50\ km^2$ eq. x years

It is hard to get information on points of artillery concentration, heavy vehicle movements and war scrap. The role of aerial bombardment clearly trumped artillery in the Persian Gulf War. The scars left on nature by the movement of heavy vehicles can still be seen from the air, even if they have to some extent been covered by vegetation. In Kuwait, war scrap has reportedly been collected in fenced landfills and covered with sand. The overall environmental impact of ground operations appears to be about one order of magnitude less that the effects of bombs and missiles.

The deliberate oil destruction of the Iraqis is a special feature of the Persian Gulf War /29/. Oil was deliberately released into the sea from at least two terminals and several tankers. The scale of these releases has been estimated at just under 1,000,000 m^3. Much of this oil eventually evaporated or was collected, but part (perhaps 100,000–200,000 m^3) washed up on beaches or sank to the bottom of the sea causing damage to the delicate ecosystems along the coast for about 700 kilometers from the Strait of Hormuz to Abu Ali Island.

About 650 wellheads were also set on fire. At the peak of the crisis, some 500,000 m^3 of oil were burned each day. Huge black clouds of smoke and ash filled the skies, and the toxic smoke, oil, ash and acid rains added to the environmental destruction. It is estimated that nearly half of the oil released in the Persian Gulf was precipitated from the sky in the form of oil rain. The valves to about 82 oil wells were also opened, creating large lagoons of oil surrounding them.

One problem with estimating the environmental impact of oil well destruction is that oil has always been part of Persian Gulf ecosystems. Moreover, oil's role has increased in the area since oil production began. Prior to the war, the Persian Gulf had suffered several major oil spills in the range of 100,000 m^3. The flaring of natural gas is also a common part of oil production in the area. It is estimated that oil released by the oil industry and through natural seepage puts tens or perhaps hundreds of thousands of cubic meters of oil into the Persian Gulf each year.

The extent of deliberate oil releases during the war remains unique in history. Because oil in the environment was not seen as something particularly unusual, attempts to clean up the mess were lackluster. Despite the absence of effort over the past decade, the signs of the oil release in the Persian Gulf region are minimal today.

Natural water circulation in the Persian Gulf and winds from the north concentrated the oil effects on the shallow coastal waters on the Saudi Arabian side /2/. It is estimated that the heaviest effects of the oil involved a sea area of 2,000 km^2 and a 0.5-km-wide shoreline zone for 200 km, as well as a more lightly impacted sea area of 10,000 km^2 and a 0.2-km-wide shoreline zone of 500 km (water birds covered with oil, plankton die-offs and algae blooms, etc.). The reflection effects such as impacts on migratory bird populations are included by assigning a multiplier of 1.5 and the important shoreline ecosystem is given a significance value of 6.0. The estimated short-term environmental impact of oil spills would be:

I = -1.5 x (2,000 km^2 x 0.2 x 1.5 x 0.5 x 1 year + 200 km x 0.5 km x 6.0 x 0.4 x

0.5 x 1 year + 10,000 km^2 x 0.02 x 1.5 x 0.5 x 1 year + 500 km x 0.2 km x 6.0 x 0.1 x

0.5 x 1 year) = -900 km^2 eq. x year

The long-term effects of oil spills are concentrated in the hardest-hit areas. These various effects are described in reference /43/. The estimate here is:

I = -1.5 x (2,000 km^2 x 0.05 x 1.5 x 0.5 x 10 years + 100 km^2 x 6.0 x 0.2 x 0.5 x 10 years +

10,000 km^2 x 0.005 x 1.5 x 0.5 x 4 years + 100 km^2 x 6.0 x 0.02 x 0.5 x 4 years) =

-2,300 km^2 eq. x years

The effects of smoke, poisonous gases, ash fallout, oil and acid rain on natural wealth and diversity are short-lived over a broad area. If the affected area has an average significance multiplier of 1.0, the estimated impact would be:

I = -(20,000 km^2 x 0.1 x 1.0 x 0.5 x 1 year + 2,000 km^2 x 0.1 x 1.0 x 0.5 x 10 years) =

-2,000 km^2 eq. x years

Overall, the estimated environmental impact of the Persian Gulf War would be about 15,000 km^2 eq. x years not counting the impact of carbon dioxide emissions. The effects of bombardment, oil spills and infrastructure destruction dominate this estimate.

City of Helsinki (historical footprint and disturbance effects)

Helsinki was founded in the mid-1500s. The city currently has a land area of 187 km^2 and a water area of about 500 km^2. The population of Helsinki was about 20,000 in 1850, 100,000 in 1900, 350,000 in 1950, and 500,000 in 2000. In 1946, the unincorporated areas in Helsinki were incorporated. These areas contained sizable populations, adding about 50,000 new residents to the city.

According to a current map of the city, the types of areas found in Helsinki and their relative environmental impacts include:

Downtown and industrial areas	20 km^2	- 40 %
Developed suburbs	50 km^2	- 20 %
Commercial fields	20 km^2	- 20 %
Suburbs with single-house lots	50 km^2	- 5 %
Natural areas and parks	40 km^2	- 1 %
Water areas in active use	60 km^2	- 5 %
Other water areas	440 km^2	- 1 %

Assume that in the 1900s, the city's environmental impact developed along with the population. This gives an environmental impact of:

I = (-3 x 0.7 x (20 km^2 x 0.4 + 50 km^2 x 0.2 + 20 km^2 x 0.2 + 50 km^2 x 0.05 +

40 km^2 x 0.01) – 1.5 x 0.7 x (60 km^2 x 0.05 + 440 km^2 x 0.01)) x 100 years =

-6,000 km^2 eq. x years

In the 1800s, Helsinki was still a small town. Today's urban areas were once farm land, forest or fishing areas. The environmental impact is estimated to be:

I = (-3 x (2 km^2 x 0.2 + 20 km^2 x 0.2 + 30 km^2 x 0.05 + 200 km^2 x 0.01) –

1.5 x (60 km^2 x 0.01)) x 100 years = -880 km^2 eq. x years

Prior to 1800, the environmental impacts were small, perhaps a fifth, due to the small population. This gives an environmental impact legacy of I = -7,000 km^2 eq. x years

Artificial lake of Vuotos

Clearing the lake area and construction would turn 250 km^2 of mostly forest and marshy wilderness (similar to a large part of Siberia) into a lake environment. The local impact in natural wealth and biodiversity is abrupt but transition occurs in 20 years. The estimated environmental impact is:

I = -3.0 x 250 km^2 x 0.5 x 0.5 x 20 years = -3,750 km^2 eq. x years

The environmental benefit of clean energy production from lake Vuotos is estimated in Appendix 4.

Exxon Valdez oil spill

The Exxon Valdez oil tanker ran aground in the northern section of the Prince William Sound on March 24, 1989. Widely considered one of the worst oil spills ever, some 42,000 m^3 of crude oil spilled into the sea, contaminating about 2,000 km of shoreline to some extent. The environmental impacts were harshest in Prince William Sound itself, but the oil spread as far as 750 km to the southeast through the Kenai Peninsula, the Kodiak Archipelago and the shorelines of the Alaskan Peninsula. Over time most of the oil dispersed or dissolved in the water. In addition, 14 % was recovered and 13 % is estimated to have sunk to the sea bottom. A 1992 study found that 2 % of the oil was still in the shoreline areas. In 2001, several kilometers of Prince William Sound shoreline were still declared oil contaminated /15/.

The site of the accident has a high natural value. It was especially damaging to the birdlife, mammals and fish stocks, and vegetation of the Prince William Sound area. Some wildlife has not been restored to original levels and some species have not shown clear signs of recovery (Harbor Seal, Pacific Herring, Harlequin Duck, Arctic Loon, Little Auk and three species of cormorants) /15/. The long-term and indirect impacts of the oil spill in the ecosystem are discussed in reference /46/.

Estimating the environmental impacts of the oil spill, we simplify into heavily or moderately damaged shorelines (300 km), lightly impacted shorelines (1,700 km, thin oil film detected or occasional clumps of oil), the worst-hit areas in the Prince William Sound (2,000 km^2), and short-term effects of the oil slick in Prince William Sound and its vicinity. The oil-staining of birds and their poisoning is also seen in this estimate as an impact on natural wealth in nesting areas, which are typically near shorelines. Because shoreline areas have a special significance in local ecosystems, we give it a significance multiplier of 6. Considering various reflection effects (bird migration, fish spawning, plankton drifts, etc.), we apply a multiplier of 1.5. Thus, the estimated environmental impact of the Exxon Valdez oil spill would be:

I = -1.5 x (40 km x 0.4 km x 0.4 x 6 x 0.5 x 10 years + 260 km x 0.4 km x 0.1 x 6 x 0.5 x

2 years + 1700 km x 0.2 km x 0.02 x 6 x 0.5 x 1 year + 2,000 km^2 x 0.1 x 0.5 x 10 years +

20,000 km^2 x 0.01 x 0.5 x 1 year) = -2,000 km^2 eq. x years

Mankkaa landfill site (30-year lifespan)

A landfill for municipal waste and excavation waste was operating in the Mankkaa peat bog near Helsinki between the 1950s and the mid-1980s. It initially was used for waste from Espoo, the city directly west of Helsinki, but in its final years, the landfill received waste from all over the greater Helsinki region. At the time of its closure, the landfill covered a total area of about 70 hectares. After closure, the area was landscaped. Today the area teems with plants and animals, and features meadows, shrub areas, and forest belts. Most of the area is dedicated to outdoor recreation, with a small area used for outdoor storage of construction materials.

We assume that the Mankkaa landfill consists of four 10-ha areas and one 30-ha area, and each has had a 10-year active period (construction, filling, covering) as well as a 15-year landscaping period. If the impact on natural wealth and biodiversity in the active landfill-area is 50 %, and the footprint reflection (disturbance effect, transport of hazardous substances, increased gull and crow populations, removal of excess excavation materials, etc.) are considered with a multiplier of 2, the estimated environmental impact of the Mankkaa landfill would be:

$I = -2 \times (0.7\ km^2 \times 0.5 \times 3 \times (10\ years + 0.5 \times 15\ years)) = -40\ km^2$ eq. x years

Methane generated by the landfill that is recovered for fuel or burning or leaks into the atmosphere is not included in this estimate. Neither is the increase in biodiversity of the area as compared to the original situation (a marsh used for turf lifting).

100 hectare forest farm (100 years)

Finnish forest typically contain many blocks of forest that have been cut at some point in the past, with the quality of forest ranging from recent clear-cuts to virgin old-growth forest. Under current practices, areas near shorelines are protected from commercial cutting and expected to be kept in their natural condition. Some forest areas, for other reasons, are excluded from the forest management program. Forestry practices affect natural wealth and biodiversity only in those areas that are dominated by forestry activity. If the impact of this activity on natural wealth and biodiversity is 5 % over a 0.4 km^2 area, the estimated environmental impact would be:

$I = -0.4\ km^2 \times 0.05 \times 3 \times 100\ years = -6\ km^2$ eq. x years

100 MW offshore wind farm

The environmental impacts of an offshore wind farm can be divided into impacts of the construction and impacts of the wind farm while in operation.

The impacts of construction consist of short term noise and suspension effects and footprint effect. Consider a typical windfarm with gravity foundations and some dredging and erosion protection works for foundations and cabling. The disturbance and suspension effect will be very local and short duration. Full recovery of the bottom ecosystem the dredged and filled

areas will take longer but may actually grow richer than the original. Ignoring this we get the impact estimate for construction in a shallow water area with importance factor of 2.0:

I = -2.0 x 0.2 km^2 x 0.05 x 0.5 years – 2.0 x 0.05 km^2 x 0.2 x 0.5 x 2 years =

-0.03 km^2 eq. x years

The wind farm will have disturbance effects for natural life during its operation. Especially migrating birds seem to go around wind turbines from some distance. Local birds seem to get partially used to the turbines. The environmental impact of operating the wind farm is estimated as:

I = -2.0 x 10 km^2 x 0.002 x 50 years = -2 km^2 eq. x years

We may note that about 15 000 tons of steel is needed for the wind farm structures. If 75 % of steel is circulated (as typically in Finland) manufacturing of the steel structures will involve 15,000 tons of carbon dioxide emissions. The environmental impact of this is:

I = -2 km^2 eq. x years//kt CO_2 x 15 kt CO_2 = -30 km^2 eq. x years

The basis for this and the benefits of producing clean energy are discussed in Appendix 4.

Wastewater spill accident at the Kaukas pulp mill in June 2003

A malfunction at the wastewater treatment plant of the Kaukas pulp mill in June 2003 led to an inadvertent wastewater spill that exceeded permitted limits. The spill introduced, among other things, detergents and black liquor into the water system. Fish kills were detected within an approximately 3 km^2 area. The contaminated brownish water had a foul smell, and a broad area was covered with foam. According to the maps released by the Lake Saimaa Water Protection Association, the hardest-hit waters covered an area of about 10 km^2. Observations of the detected effects typically varied between several weeks to a few months.

The impact of the release on natural wealth and biodiversity was most intense next to the pulp mill, even if that particular ecosystem had become somewhat tolerant of limited wastewater releases. Within a month after the spill, the waters near the pulp mill had begun to clear up and test fishing showed that the structure of the fish stocks had not been affected. Farther away, the disturbance effect of the spill on the waters was analogous to smoke emissions into the air. The impacts on natural wealth and biodiversity were limited. Assigning a significance multiplier of 1.5, the environmental impact would be:

I = -1.5 x (1 km^2 x 0.2 x 0.5 x 2 years + 2 km^2 x 0.10 x 0.5 x 1 year + 10 km^2 x 0.02 x

0.5 x 1 year) = -0.6 km^2 eq. x years

Family house with garden

Assume a single-family house in the suburbs on a modest-sized lot (0.2 ha). The structure has a 0.01 ha footprint and has a service life of 100 years. The landscaping takes about 20 years. The estimated environmental impact would be:

$I = - (0.002\ km^2 \times 0.05 + 0.0001\ km^2 \times 0.5) \times 3 \times (100\ years + 0.5 \times 20\ years) =$

$-0.05\ km^2$ eq. x years

Landfill waste of a Finnish family (100 years)

The average resident in the Helsinki region generates over 300 kg of trash each year. Thus, a nuclear urban family (e.g. one senior, two working parents and two children all living under the same roof) would produce about 1.5 tons of trash each year. At the landfill, this waste is compressed and encased in a waste mound, which can be up to 40 meters in height. The density of trash in the waste mound is about 700 $kg/m^{3.}$ About 20 % of the waste mound's total volume is soil.

Modern methods of construction and filling make it possible to recover most of the methane generated by anaerobic decomposition of waste so that it can be burned for energy. Other emissions are minimal from the standpoint of natural wealth and biodiversity. The recognized environmental impacts are largely the footprint effect, the reflection effect of increased gull and crow populations on local ecosystems, and the disturbance effect of landfill activity.

In 100 years, a Finnish family would produce 150 tons of mixed waste. Disposal of this trash would expand the surface area of the waste mound by 15 m^2 over the century. Assuming that the surface area needed for landfill operation is double the surface area of the waste mound, taking into account the disturbance effects and footprint reflection with a multiplier of 2, and assuming that the active life of landfill is 20 years and that landscaping period 10 years, we get the following environmental impact estimate:

$I = -3 \times 0.00006\ km^2 \times 0.5 \times (20\ years + 0.5 \times 10\ years) = -0.002\ km^2$ eq. x years

APPENDIX 4: BENEFIT CALCULATIONS

Assessing the magnitude of environmental benefits of investments in power projects to reduce carbon dioxide emissions

Energy investments to cut carbon dioxide emissions range from energy saving measures to replacing non-renewable power systems that produce carbon dioxide with renewable technologies such as hydro, wind, solar and with nuclear power.

Figure A.4.1 presents a simplified version of a somewhat optimistic IPCC scenario for carbon dioxide emission trends along with the author's estimate of the corresponding environmental impact (curves 1e for emissions and 1i for environmental impact). This emission scenario foresees a three-degree increase in the average global temperature. It is used here as the basic scenario for purposes of discussion. We assume that by mid-century carbon dioxide emissions will be reduced globally either through technological and social measures, or as a result of some kind of crises.

Figure A.4.1. also shows a theoretical emissions scenario where the feedback system in the greenhouse phenomenon is broken immediately and the resulting negative environmental impacts are put in check (curves 2e and 2i). This makes it possible to estimate the positive environmental impact from investing in technologies or approaches that reduce carbon dioxide emissions.

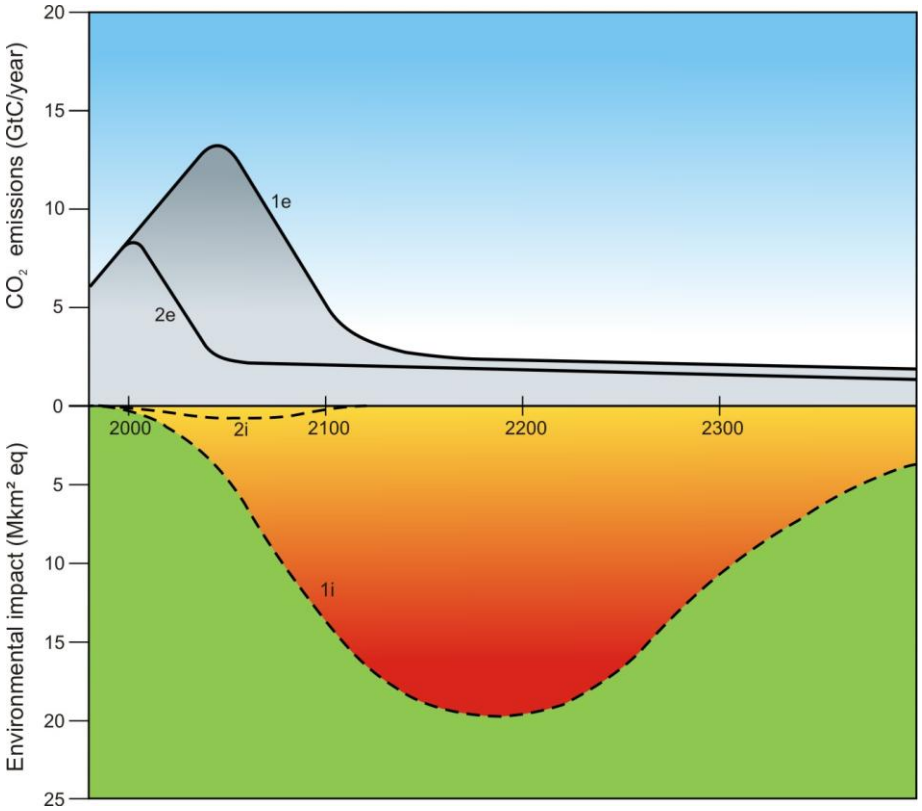

Figure *A.4.1. Two trend scenarios for carbon dioxide emissions and estimates of their environmental impacts as a function of time.*

In reference scenario 1, about 680 more gigatons of carbon (C) or 2,500 more gigatons of carbon dioxide (CO_2) are emitted into the atmosphere than in scenario 2. The introduction of this additional carbon occurs over an approximately 80-year period.

In the reference scenario, the maximum environmental impact is assumed to be -20 million km² eq. and the total environmental impact 5,000 million km² eq. x years. In the second scenario, environmental impact is assumed to remain below a significant level.

The maximum environmental impact would thus be 20 Mkm² eq./2,500 Gt CO_2 =
-8 km² eq./Mt CO_2

The total environmental impact is 5,000 Mkm² eq. x v/2,500 Gt CO_2 =
-2 km² eq. x years/kt CO_2

Investment in clean energy production or energy saving measures reduces carbon dioxide emissions by 7,000 tons a year per megawatt if it is assumed to replace coal-fired power plant capacity. If investment is made in the current decade, the savings from avoiding the 70-year transition period amounts to 500 kt CO_2/MW.

For the maximum environmental impact, savings average +4 km² eq./MW relative to the reference scenario.

For the total environmental impact, savings average +1,000 km² eq. x years/MW

Environmental impacts accumulate exponentially as a function of carbon dioxide emissions. Thus, lowering the peak of curve 1 has a huge positive environmental impact. Moreover, even if carbon dioxide emissions cut by only a third from that in the reference scenario, the total environmental impact is reduced to a fraction from that in the reference scenario. In accordance with the law of diminish returns, further reductions in carbon dioxide emissions as large environmental benefits.

This also has a basis in game theory. If others cut emissions first, then it diminishes pressure on those who delay as the harms of climate change takes longer to materialize and are manifested in more subdued forms.

Benefit analyses for the Vuotos hydropower project and off-shore wind farms

The Vuotos hydropower project would produce about 350 GWh of clean electrical power during periods of high demand, which converts to an average of 40 MW. From this, we obtain the following environmental benefit (I):

I= 40 MW x 1000 km² eq. x years/MW = +40,000 km² eq. x years

In other words, the benefit is an order of magnitude larger than the harm. The Vuotos power plant would produce adjustment electricity during periods of peak demand long into the future. According to the IPCC, the environmental impacts of carbon dioxide emissions are the greater the longer cuts are postponed.

Moreover, the peak-power generation capacity of the Vuotos hydropower plant could compliment other clean energy projects, such as the construction of two 100 MW offshore wind farms (average power 35 MW) by supplying the power grid during peak demand when wind conditions are poor.

The environmental benefit of cutting carbon dioxide emissions for one 100 MW offshore wind farm, assuming it is built immediately, would be:

$I = +35$ MW x 1,000 km^2 eq. x years/ MW = +35,000 km^2 eq. x years

The benefit is three orders of magnitude greater than the harms from producing the steel for the turbines and masts, construction work and operation. The benefit must extend beyond the assumed life of the wind farm. In other words, the planned 50-year service life of the wind farm must be extended either through maintenance, by building a new wind farm in place of the old one, or by finding other ways to compensate for the lost production.

In Finland's sea territories it is easy to identify shallow areas suitable for construction of around 5,000 MW of wind turbine capacity, generating electricity at a reasonable price by European standards. Wind power generated at this scale, however, needs to be supported at peak-demand times by an adjustment source, for example traditional hydropower or pumped hydropower.

The environmental administration had resisted the Vuotos artificial lake project with all possible means including the Commission card. In 2002 The Supreme Administrative Court decided, after considering also EU directives, that the creation of the artificial lake would cause so large harmful environmental changes in the area that it denied the permit in accordance with article 2, clause 5 of Finland's Water Act.

In light of the above calculations, the ruling of the Supreme Administrative Court decision on the Vuotos project is quite interesting. The environmental benefits alone appear to be an order of magnitude greater than the harms. There would have also been large economic and social benefits in the area suffering from high unemployment. The law also says that there should be a comparison of benefits and harms in permit consideration.

Given the above discussion, it is also worth noting that the Ministry of the Environment blocked the start of construction on a small offshore wind farm by issuing a demand for a complete EIA (see Chapter 6). The examples illustrate the administration's attitude towards rapid and positive measures to cut carbon dioxide emissions.

APPENDIX 5: JUDGMENT OF THE COURT (SIXTH CHAMBER) OF 18 APRIL 2002. - PALIN GRANIT OY VERSUS THE VEHMASSALO PUBLIC HEALTH MUNICIPAL JOINT BOARD.

Case 62000J0009

Judgment of the Court (Sixth Chamber) of 18 April 2002. - Palin Granit Oy and Vehmassalon kansanterveystyön kuntayhtymän hallitus. - Reference for a preliminary ruling: Korkein hallinto-oikeus - Finland.

Issues raised: Harmonisation of laws - Directives 75/442/EEC and 91/156/EEC - Concept of "waste" - Production residue - Quarry - Storage - Use of waste - No risk to health or the environment - Possibility of recovery of waste. - Case C-9/00.

Summary

Leftover stone resulting from stone quarrying which is stored for an indefinite length of time to await possible use must be classified as waste within the meaning of Directive 75/442 on waste, as amended by Directive 91/156, if the holder discards or intends to discard that leftover stone. The place of storage of leftover stone, its composition and the fact, even if proven, that the stone does not pose any real risk to human health or the environment are not relevant criteria for determining whether the stone is to be regarded as waste.
(see paras 39, 51, operative part 1-2)

Parties

In Case C-9/00,
REFERENCE to the Court under Article 234 EC by the Korkein hallinto-oikeus (Finland) for a preliminary ruling in the proceedings pending before that court instituted by

Palin Granit Oy
and
Vehmassalon kansanterveystyön kuntayhtymän hallitus,

on the interpretation of Article 1(a) of Council Directive 75/442/EEC of 15 July 1975 on waste (OJ 1975 L 194, p. 39), as amended by Council Directive 91/156/EEC of 18 March 1991 (OJ 1991 L 78, p. 32),

THE COURT
(Sixth Chamber),
composed of: F. Macken, President of the Chamber, J.-P. Puissochet (Rapporteur), R. Schintgen, V. Skouris and J.N. Cunha Rodrigues, Judges,
Advocate General: F.G. Jacobs,
Registrar: R. Grass,

after considering the written observations submitted on behalf of:
- the Vehmassalon kansanterveystyön kuntayhtymän hallitus, by J. Keskitalo, director of health control, and L. Suonkanta, head of economic affairs,
- the Finnish Government, by E. Bygglin, acting as Agent,

- the Commission of the European Communities, by H. Støvlbaek, acting as Agent, assisted by E. Savia, lawyer,
having regard to the report of the Judge-Rapporteur,
after hearing the Opinion of the Advocate General at the sitting on 17 January 2002,
gives the following
Judgment

Grounds

1 By order of 31 December 1999, received at the Court on 13 January 2000, the Korkein hallinto-oikeus (Supreme Administrative Court) (Finland) referred to the Court for a preliminary ruling under Article 234 EC one main question and four sub-questions on the interpretation of Council Directive 75/442/EEC of 15 July 1975 on waste (OJ 1975 L 194, p. 39), as amended by Council Directive 91/156/EEC of 18 March 1991 (OJ 1991 L 78, p. 32, hereinafter 'Directive 75/442').

2 Those questions were raised in appeal proceedings challenging the grant of an environmental licence by the Vehmassalon kansanterveystyön kuntayhtymän hallitus (Vehmassalo public-health municipal joint board, hereinafter 'the joint board') to a company, Palin Granit Oy (hereinafter 'Palin Granit'), to operate a granite quarry. Under Finnish law, the municipal authorities are not competent to grant an environmental licence for a landfill and, consequently, the outcome of the main proceedings depends on whether leftover stone resulting from stone quarrying is to be regarded as waste.

Community legislation
3 In the first paragraph of Article 1(a) of Directive 75/442, 'waste' is defined as 'any substance or object in the categories set out in Annex I which the holder discards or intends or is required to discard.'
4 In Article 1(c) of that directive, 'holder' is defined as the 'producer of the waste or the natural or legal person who is in possession of it'.
5 Annex I to Directive 75/422, headed 'Categories of waste', includes, under head Q11, '[r]esidues from raw materials extraction and processing (e.g. mining residues, oil field slops, etc.)' and, under head Q16, '[a]ny materials, substances or products which are not contained in the above categories'.
6 The second subparagraph of Article 1(a) of Directive 75/442 provides that the Commission is to draw up 'a list of wastes belonging to the categories listed in Annex I'. Pursuant to that provision, the Commission, by Decision 94/3/EC of 20 December 1993 establishing a list of waste pursuant to Article 1(a) of Directive 75/442 (OJ 1994 L 5, p. 15), adopted the 'European Waste Catalogue' (hereinafter 'the EWC'), which includes inter alia '[w]aste resulting from exploitation, mining, dressing and further treatment of minerals and quarrying'. The introductory note in the Annex to Decision 94/3 states that that catalogue 'applies to all wastes, irrespective of whether they are destined for disposal or recovery operations' and that it is a 'harmonised and non-exhaustive list of wastes, that is to say, a list which will be periodically reviewed' but, however, the 'inclusion of a material in the EWC does not mean that the material is a waste in all circumstances' and '[t]he entry [in the list] is only relevant when the definition of waste has been satisfied'.
7 Articles 9 and 10 of Directive 75/442 provide that any establishment or undertaking which carries out the waste disposal operations specified in Annex II A or the waste recovery operations specified in Annex II B to that directive must obtain a permit from the competent authority.

8 The list of disposal operations in Annex II A to Directive 75/442 includes, under head D1, '[d]eposit into or onto land (e.g. landfill, etc.)', under head D12, '[p]ermanent storage (e.g. emplacement of containers in a mine, etc.)' and, under head D15, '[s]torage pending any of the operations in this Annex, excluding temporary storage, pending collection, on the site where it is produced'. The list of recovery operations in Annex II B to the directive includes, under head R13, '[s]torage of materials intended for submission to any operation in this Annex, excluding temporary storage, pending collection, on the site where it is produced'.

9 An exemption from the permit requirement is, however, provided by Article 11 of Directive 75/442, the first paragraph of which states as follows:

'... the following may be exempted from the permit requirement imposed in Article 9 or Article 10:

(a) establishments or undertakings carrying out their own waste disposal at the place of production;

and

(b) establishments or undertakings that carry out waste recovery.

This exemption may apply only:

- if the competent authorities have adopted general rules for each type of activity laying down the types and quantities of waste and the conditions under which the activity in question may be exempted from the permit requirements,

and

- if the types or quantities of waste and methods of disposal or recovery are such that the conditions imposed in Article 4 are complied with'.

10 The 'conditions imposed in Article 4' of Directive 75/442 are that human health is not to be endangered and that the environment is not to be harmed.

National legislation

11 Directive 75/442 was transposed into Finnish law by the Law on waste (1072/1993) which is intended to prevent the production of waste, reduce its hazardous properties, and promote its recovery.

12 Article 3(1) no. 1 of that law defines waste as 'any substance or object which its holder discards or intends or is required to discard'. That definition is supplemented by a list of substances or objects classified as waste, contained in Annex I to the Decree on waste (1390/1993). That list contains 16 categories, of which Q11 covers 'residues from the extraction or processing of raw materials such as mining residues or oil field slops'.

13 Article 3(1) nos. 10 and 11 of the Law on waste (1902/1993) define recovery as 'any action intended to recover or use the material or the energy contained in the waste' and treatment as 'any activity intended to neutralise and permanently deposit the waste'.

14 According to Article 1 of Decree 1390/1993, the provisions of Law 1072/1993 relating to licences to deposit waste do not apply to the use or treatment at the place of extraction of natural non-hazardous waste produced from the extraction of soil materials.

15 Decision 867/1996 of the Ministry of the Environment, which was adopted pursuant to Law 1072/1993 and lists the most common types of waste and hazardous waste, includes waste resulting from the exploration, extraction, dressing and other treatment of minerals, from stone processing, and from gravel production. According to the introduction to that list, the terminology used therein is based on the EWC and the list is only intended as guidance. An object or substance contained in that list is waste only if it exhibits the characteristics referred to in Article 3(1) no. 1 of Law 1072/1993.

16 According to Article 5 of the Law concerning the environmental licensing procedure (735/1991), as amended by Law 61/1995, the authority which is competent to grant the environmental licence is either the municipal authority or the regional environment centre. Article 1(1) of the Decree on the environmental licensing procedure (772/1992), as amended

by Decree 62/1995, which lists the cases for which the regional environment centre is competent, includes, at no. 14, environmental licence matters concerning landfills.

The main proceedings

17 On 25 November 1994, Palin Granit applied to the joint board for an environmental licence for a granite quarry. That application included a plan for management of the leftover stone and mentioned the possibility of recovering that stone by using it as gravel or filling material. It also stated that the leftover stone from the quarrying, amounting to around 50 000 m3 per annum, and between 65 to 80% of the total stone quarried, would be stored on an adjacent site. The joint board granted Palin Granit a provisional environmental licence subject to several conditions strengthening the obligation to ensure that the operation of the quarry caused minimal harm to the population and the environment.

18 Seized by the Turan ja Porin lääninhallitus (Turku and Pori Provincial Administration), the Turun ja Porin lääninoikeus (Turku and Pori Administrative Court) held that the leftover stone was waste for the purposes of Law 1072/1993 and that its storage site was a landfill for the purposes of the Decision of the Council of Ministers on landfills (861/1997). The lääninoikeus, finding that, under Finnish law, the Lounais-Suomen ympäristökeskus (the regional environment centre of South-West Finland, hereinafter 'the environment centre') was the competent authority for the granting of environmental licences for landfills, set aside the joint board's decision on the ground that the joint board was not the competent authority.

19 Palin Granit and the joint board brought an appeal before the Korkein hallinto-oikeus challenging the classification of the leftover stone as waste. Palin Granit submitted that the leftover stone, whose mineral composition was identical to that of the basic rock from which it was quarried, was stored for short periods for subsequent use without the need for any recovery measures and did not pose any risk to human health or the environment. In that respect, it differed from mining by-products which, despite their hazardous nature, have not been classified as waste by national law and case-law. Moreover, according to the first subparagraph of Article 1(2) of Decree 1390/1993, non-hazardous soil waste which is treated at the place of extraction falls within the scope of the Law on substances contained in soil (555/1981) and not within the scope of the rules on waste.

20 Conversely, the environment centre, concurring with an opinion of the Ministry of the Environment, claims that the leftover stone ought to be regarded as waste as long as evidence of reuse of the stone has not been provided.

21 In order to determine which authority is competent to grant Palin Granit the environmental licence sought by it, the Korkein hallinto-oikeus decided to stay the proceedings and refer the following questions to the Court for a preliminary ruling:

'Is leftover stone resulting from stone quarrying to be regarded as waste within the meaning of Article 1(a) of Council Directive 75/442/EEC of 15 July 1975 on waste, as amended by Council Directive 91/156/EEC of 18 March 1991, having regard to points (a) to (d) below?

(a) What relevance, in deciding the above question, does it have that the leftover stone is stored on a site adjoining the place of quarrying to await subsequent use? Is it relevant generally whether it is stored on the quarrying site, a site next to it or further away?

(b) What relevance does it have that the leftover stone is the same as regards its composition as the basic rock from which it has been quarried, and that it does not change its composition regardless of how long it is kept or how it is kept?

(c) What relevance does it have that the leftover stone is harmless to human health and the environment? To what extent generally is importance to be attached to its possible effect on health and the environment in assessing whether it is waste?

(d) What relevance does it have that the intention is to transfer the leftover stone in whole or in part away from the storage site for use, for example for landfill or breakwaters, and that it

could be recovered as such without processing or similar measures? To what extent in this connection should attention be paid to how definite the plans are which the holder of the leftover stone has for such use and to how soon after the leftover stone has been deposited on the storage site the use takes place?'

The main question

22 In the first subparagraph of Article 1(a) of Directive 75/442 waste is defined as 'any substance or object in the categories set out in Annex I which the holder discards or intends or is required to discard'. Annex I and the EWC clarify and illustrate that definition, by providing lists of substances and objects which may be classified as waste. However, those lists are only intended as guidance and the classification of a substance or object as waste is, as the Commission rightly submits, primarily to be inferred from the holder's actions, which depend on whether or not he intends to discard the substances in question. Therefore, the scope of the term 'waste' turns on the meaning of the term 'discard' (Case C-129/96 Inter-Environnement Wallonie [1997] ECR I-7411, paragraph 26).

23 The term 'discard' must be interpreted in light of the aim of Directive 75/442 which, according to its third recital, is the protection of human health and the environment against harmful effects caused by the collection, transport, treatment, storage and tipping of waste, and Article 174(2) EC, which provides that Community policy on the environment is to aim at a high level of protection and is to be based, in particular, on the precautionary principle and the principle that preventive action should be taken. It follows that the concept of waste cannot be interpreted restrictively (see Joined Cases C-418/97 and C-419/97 ARCO Chemie Nederland and Others [2000] ECR I-4475, paragraphs 36 to 40).

24 More specifically, the question whether a given substance is waste must be determined in the light of all the circumstances, regard being had to the aim of Directive 75/442 and the need to ensure that its effectiveness is not undermined (ARCO Chemie Nederland, paragraphs 73, 88 and 97).

25 Directive 75/442 does not provide any decisive criteria for determining the intention of the holder to discard a given substance or object. Nevertheless, the Court, which has been asked on a number of occasions for preliminary rulings on whether various substances are to be regarded as waste, has provided a number of indicators from which it may be possible to infer the holder's intent. The classification of leftover stone and the decision as to whether it falls into the category of residues from raw materials extraction, at head Q 11 of Annex I to that directive, must be made having regard to those factors and in the light of the aims of Directive 75/442.

26 The Commission considers that the operations of disposal and recovery of a substance or an object manifest an intention to 'discard' it within the meaning of Article 1(a) of Directive 75/442. Articles 4, 8, 9, 10, and 12 of Directive 75/442 describe those operations as methods of treatment of waste. Those operations include deposit into or onto land, which includes use as landfill material (head D1 of Annex II A), storage pending another disposal operation (head D15 of Annex II A) and storage pending a recovery operation (head R13 of Annex II B). The storage of leftover stone at the place of extraction or at a storage site thus constitutes either a disposal or recovery operation.

27 However, the distinction between waste disposal or recovery operations and the treatment of other products is often difficult to discern. Accordingly, the Court has already held that it may not be inferred from the fact that a substance undergoes an operation referred to in Annex II B to Directive 75/442 that that substance has been discarded and may therefore be regarded as waste (the judgment in ARCO Chemie Nederland, paragraph 82). The application of an operation listed in Annex II A or II B to Directive 75/442 therefore does not, of itself, justify the classification of that substance as waste.

28 The joint board and Palin Granit assert that the site where the leftover stone resulting from the operation of the quarry is stored is not a landfill but a deposit for reusable materials, inasmuch as the leftover stone is suitable for use in embankment work or for building harbours and breakwaters.
29 That argument does not preclude the leftover stone from being regarded as waste. In its judgment in Vessoso and Zanetti (Joined Cases C-206/88 and C-207/88 [1990] ECR I-1461, paragraph 9), the Court held that the concept of waste does not exclude substances and objects which are capable of economic reutilisation. In Joined Cases C-304/94, C-330/94, C-342/94 and C-224/95 Tombesi and Others [1997] ECR I-3561, paragraph 52, the Court also stated that the system of supervision and control established by Directive 75/442, as amended, is intended to cover all objects and substances discarded by their owners, even if they have a commercial value and are collected on a commercial basis for recycling, reclamation or reuse.
30 Neither the fact that the leftover stone has undergone a treatment operation referred to in Directive 75/442 nor the fact that it can be reused thus suffices to show whether that stone is waste for the purposes of Directive 75/442.
31 There are other considerations which are more decisive.
32 At paragraphs 83 to 87 of the judgment in ARCO Chemie Nederland, the Court pointed out the importance of determining whether the substance is a production residue, that is to say, a product not in itself sought for a subsequent use. As the Commission observes, in the case at issue in the main proceedings the production of leftover stone is not Palin Granit's primary objective. The leftover stone is only a secondary product and the undertaking seeks to limit the quantity produced. According to its ordinary meaning, waste is what falls away when one processes a material or an object and is not the end-product which the manufacturing process directly seeks to produce.
33 Therefore, it appears that leftover stone from extraction processes which is not the product primarily sought by the operator of a granite quarry falls, in principle, into the category of '[r]esidues from raw materials extraction and processing' under head Q 11 of Annex I to Directive 75/442.
34 One counter-argument to challenge that analysis is that goods, materials or raw materials resulting from a manufacturing or extraction process, the primary aim of which is not the production of that item, may be regarded not as a residue but as a by-product which the undertaking does not wish to 'discard', within the meaning of the first paragraph of Article 1(a) of Directive 75/442, but intends to exploit or market on terms which are advantageous to it, in a subsequent process, without any further processing prior to reuse.
35 Such an interpretation would not be incompatible with the aims of Directive 75/442. There is no reason to hold that the provisions of Directive 75/442 which are intended to regulate the disposal or recovery of waste apply to goods, materials or raw materials which have an economic value as products regardless of any form of processing and which, as such, are subject to the legislation applicable to those products.
36 However, having regard to the obligation, recalled at paragraph 23 of this judgment, to interpret the concept of waste widely in order to limit its inherent risks and pollution, the reasoning applicable to by-products should be confined to situations in which the reuse of the goods, materials or raw materials is not a mere possibility but a certainty, without any further processing prior to reuse and as an integral part of the production process.
37 It therefore appears that, in addition to the criterion of whether a substance constitutes a production residue, a second relevant criterion for determining whether or not that substance is waste for the purposes of Directive 75/442 is the degree of likelihood that that substance will be reused, without any further processing prior to its reuse. If, in addition to the mere possibility of reusing the substance, there is also a financial advantage to the holder in so

doing, the likelihood of reuse is high. In such circumstances, the substance in question must no longer be regarded as a burden which its holder seeks to 'discard', but as a genuine product.

38 In the case at issue, the Finnish Government correctly points out that the only foreseeable reuses of leftover stone in its existing state, for example in embankment work or in the construction of harbours and breakwaters, necessitate, in most cases, potentially long-term storage operations which constitute a burden to the holder and are also potentially the cause of precisely the environmental pollution which Directive 75/442 seeks to reduce. The reuse is therefore not certain and is only foreseeable in the longer term, with the result that the leftover stone can only be regarded as extraction residue which its holder 'intends or is required to discard' within the meaning of Directive 75/442, and thus falls within the scope of head Q 11 of Annex I to that directive.

39 The answer to the main question asked by the national court must therefore be that the holder of leftover stone resulting from stone quarrying which is stored for an indefinite length of time to await possible use discards or intends to discard that leftover stone, which is accordingly to be classified as waste within the meaning of Directive 75/442.

Sub-questions (a) and (d)

40 The Court has already answered sub-question (d) in the course of considering the main question. The uncertainty surrounding the proposed uses of the leftover stone and the impossibility of reusing it in its entirety support the conclusion that all that stone, and not merely the stone which will not be reused, is to be regarded as waste.

41 In any event, under Article 11 of Directive 75/442, it remains possible for national authorities to lay down rules providing for exemptions from the permit requirement and to grant such exemptions in respect of disposal and recovery operations for certain waste, and for national courts to ensure that those rules are observed in accordance with the aims of Directive 75/442.

42 As regards sub-question (a), it should be observed that, in view of the answer which has just been given to the main question, the place of storage of the leftover stone, whether it be on the quarrying site, at a place next to it or further away, is not relevant to its classification as waste. Similarly, the conditions under which the materials are kept and the length of time for which they are kept do not, of themselves, provide any indication of either their value to the undertaking or the advantages which that undertaking may derive from them. They do not show whether or not the holder intends to discard the materials.

43 With respect to sub-question (b), it must be borne in mind that at paragraph 87 of the judgment in ARCO Chemie Nederland, the Court held that the fact that a substance is a production residue whose composition is not suitable for the use made of it or that special precautions must be taken when it is used owing to the environmentally hazardous nature of its composition may constitute evidence that the holder has discarded the substance, or intends or is required to discard it within the meaning of Article 1(a) of Directive 75/442.

44 The fact that the leftover stone has the same composition as the blocks of stone extracted from the quarry and that its physical state does not change may accordingly render it suitable for the uses which could be made of it. However, that argument would be decisive only if all the leftover stone were reused. There is no doubt that the commercial value of blocks of stone depends on their size, shape and potential uses in the construction sector, qualities which the leftover stone, despite having an identical composition, does not possess. That leftover stone is therefore still production residue.

45 In addition, the risk of environmental pollution posed by unused leftover stone is not mitigated by the fact that its mineral composition is identical to the blocks of stone, inasmuch as that identity does not preclude the need for storage of the leftover material, which is an operation with an impact on the environment.

46 In any event, even where a substance undergoes a full recovery operation and thereby acquires the same properties and characteristics as a raw material, it may nevertheless be regarded as waste if, in accordance with the definition in Article 1(a) of Directive 75/442, its holder discards it, or intends or is required to discard it.
47 As regards sub-question (c), it should be observed that the fact that the leftover stone does not pose any risk to public health or the environment also does not preclude its classification as waste.
48 First of all, Directive 75/442 on waste is supplemented by Council Directive 91/689/EEC of 12 December 1991 on hazardous waste (OJ 1991 L 377, p. 20), which implies that the concept of waste does not turn on the hazardous nature of a substance.
49 Next, even assuming that the leftover stone does not, by virtue of its composition, pose any risk to human health or the environment, stockpiling such stone is necessarily a source of harm to, and pollution of, the environment, since the full reuse of the stone is neither immediate nor even always foreseeable.
50 Finally, the harmlessness of the substance in question is not a decisive criterion for determining what its holder intends to do with it.
51 The answer to the national court's sub-questions must therefore be that the place of storage of leftover stone, its composition and the fact, even if proven, that the stone does not pose any real risk to human health or the environment are not relevant criteria for determining whether the stone is to be regarded as waste.

Decision on costs

Costs
52 The costs incurred by the Finnish Government and by the Commission, which have submitted observations to the Court, are not recoverable. Since these proceedings are, for the parties to the main proceedings, a step in the action pending before the national court, the decision on costs is a matter for that court.

Operative part

On those grounds,
THE COURT
(Sixth Chamber),
in answer to the questions referred to it by the Korkein hallinto-oikeus by order of 31 December 1999, hereby rules:
1. The holder of leftover stone resulting from stone quarrying which is stored for an indefinite length of time to await possible use discards or intends to discard that leftover stone, which is accordingly to be classified as waste within the meaning of Council Directive 75/442/EEC of 15 July 1975 on waste.
2. The place of storage of leftover stone, its composition and the fact, even if proven, that the stone does not pose any real risk to human health or the environment are not relevant criteria for determining whether the stone is to be regarded as waste.

APPENDIX 6: IS THE USE OF DISPOSABLE DIAPERS AND SANITARY PADS SUSTAINABLE?

Background

In autumn 2005, environment minister Jan-Erik Enestam expressed his disgust on disposable diaper use claiming that they were choking Finnish landfills. The traditional maternity box, which has been provided free of charge to all mothers with each new child by Finland's Family Federation since 1951, included that year a guide promoting the use of reusable diapers for "ecological" reasons. The instructions stated that disposable diapers constituted the greatest single component of Finnish household waste and that the use of disposable diapers led to greater consumption of natural resources that reusable diapers.

There was even public talk of the responsibility of the parent to be around all the time. The thinking assumes that the need for the pot can be anticipated. The use of diapers can be avoided altogether.

At the same time, campaigns were launched to get menstruating women to switch to reusable sanitary pads or moon cups as part of Finland's sustainable development efforts.

Yet is the use of disposable diapers, sanitary pads and tampons actually in conflict with the goals of sustainable development? Should parents of young children, incontinent adults and much of the female population feel ashamed about using disposable products?

Filling Finland's landfills

The average Finn generates 300 kg of household waste each year (including packaging waste generated at stores). The country accumulates 1.5 million tons of household waste annually, which takes up about 0.15 km^2 of landfill area each year.

Diapers and sanitary pads constitute about 12 kg or 4 % of household waste per person, most of it baby diapers. With 60,000 babies born each year in Finland and each spending 2.5 years in diapers, we get 40,000 tons a year of baby diapers (2.5 years x 60,000 babies x 0.14 kg per diaper x 5 diapers per day x 365 days per year). Of this, about 15 % is cellulose, 15 % polymer plastics, and 70 % excreta.

Urine, feces and cellulose are all natural products and biodegrade rapidly. This leaves about 6,000 tons of polymer plastics (i.e. 100 kg/baby), that are not biodegradable and demand about 0.001 km^2 of landfill area annually. The polymers are currently made from oil. How large is a problem when organic hydrocarbons are extracted from the ground, modified and returned to ground?

Closer assessment of the facts suggests diapers represent no threat to sustainable development in Finland. Even if they add marginally to landfill expansion, there is plenty of room. Alternatives like composting or combustion at a power plant to recover the energy value are also available.

Fundamental environmental analysis

The United Kingdom Environment Agency's report *Life Cycle Assessment of Disposable and Reusable Nappies in the UK* /69/, identifies and quantifies the environmental impacts of nappy use, including all materials and energy consumed during manufacture, distribution, use and disposal for three types of nappies: disposable nappies, home laundered flat cloth nappies, and commercially laundered prefolded cloth nappies delivered to the home.

The environmental impact categories assessed were resource depletion, global warming, ozone depletion, human toxicity, acidification, fresh-water aquatic toxicity, terrestrial toxicity, photochemical oxidant formation, and eutrophication.

The study concludes that for the three nappy systems assessed, there is no significant difference in the environmental impact, even if each product had its own distinct life cycle.

Although the study was carried out in accordance with guidelines set forth by EU environmental policy experts, it ignored a key question: What were the absolute and relative significance of the problems? In the following discussion, therefore, we attempt to fill out the study by working out the absolute and relative environmental impacts of disposable diapers. We assume the energy production profile and other constraints are roughly equivalent for the UK and Finland. We focus only on the most foreseeable impacts.

Resource depletion: Crude oil and natural gas are by far the most important resources affected here. The British life-cycle analysis indicates that a total of 200 kg of oil and gas is consumed in reusable nappies of a baby. In Finland this translates to 12,000 tons of oil and gas annually. This corresponds to less than 0.1 % of Finland's oil and gas consumption.

The world's accessible oil and gas reserves are rapidly being consumed (e.g. global consumption is about 1,000 barrels a second). On the other hand, other hydrocarbon reserves such as oil shale and coal supplies remain abundant and could last for centuries. Energy and polymers can be produced also from renewable resources.

Global warming: Life-cycle analysis shows that the effects of global warming are about 600 kg CO_2 eq. per baby for the use of disposable diapers, which works out to a total of 35,000 tons CO_2 eq. a year, or 0.04 % of Finland's greenhouse gas emissions.

Greenhouse emissions could have serious consequences, the magnitude of which is hard to estimate. In any case, diapers represent a miniscule part of this problem. Furthermore, emissions decrease as the energy production profile changes.

Ozone depletion: Life-cycle analysis indicates the amount of emissions that affect ozone layer depletion works out to 0.0002 kg CFC-11 eq. per baby. This is due largely to waste processing after use. This means Finnish babies contribute a total of about 12 kg CFC-11 eq. annually to ozone depletion. Finland's production of chemicals that deplete the ozone layer is presently 10,000 kg CFC-11 eq. /67/. Emissions are probably much greater than this because the imports of products with CFC-emitting potential was two orders of magnitude higher than at present as recently as1990.

In any case, CFC emissions are rapidly declining, and if international treaties continue to be upheld, the ozone layer should recover to its 1980s condition by 2050 /64/. Thus, in this

improving situation, there are no signs of any significant new ozone depletion problems emerging and the relationship of diapers to this problem is tenuous at best.

Acidification: Life-cycle analysis indicates less than 4 kg SO_2 eq. acidification per baby, mainly associated with diaper manufacture and transport. This is roughly 200 tons per Finnish baby population per year, or about 0.1 % of acidifying emissions in Finland.

Acidification is a localized problem in Finland, so it has little impact on biodiversity or natural wealth /64/. Diapers contribute almost nothing to this problem, and the biggest gains are to be had in improvements in electrical power generation and maritime traffic. A marginal portion of a local problem is not much of a problem.

Eutrophication of fresh waters: Life-cycle analysis gives an eutrophication impact of about 0.34 kg PO_4 eq. per baby, stemming largely from manufacturing, transport and waste life cycles. The disposable diaper use of Finnish babies overall generates roughly 20 tons PO_4 eq. of nutrient impact. This is very roughly /69 and 67/ 0.02 % of Finland's artificial (anthropogenic) eutrophication effect.

While the adding of nutrients is usually seen as a plus for soils, excessive nutrients can be a moderate problem in fresh water bodies. Diaper use, however, contributes virtually nothing to this problem.

Overall impact: Of the categories surveyed, global warming is the only one here likely to have a substantial impact on the environment. This effect, like most of the effects in the other categories, depends mostly on how energy is used and produced.

The UK diaper study shows that by far the greatest expenditure of energy in the disposable diaper's life cycle occurs during manufacture, while the greatest energy inputs in reusable diapers are associated with washing machine use. In terms of energy consumption, disposable diapers perform slightly better than reusable diapers.

Social and health issues

Low birthrates are considered problematic in many European countries, including Finland. One reason for the low birth rate is the pressure on young people, who today are responsible for not only the child's well-being, but also the well-being of the family and securing a decent future for the nation. This is a big responsibility.

With the available time in the day, a good parent is expected to spend time cuddling the baby, reading and singing to the baby, playing with the baby, changing the baby, feeding the baby, dressing the baby, washing the baby – and now also washing the diapers. The parents also have to deal with possible rashes and other skin hygiene problems.

It is the parents' duty to decide the amounts of diapers they use and what kind of diapers they use. If they are pressured to conform to routines that disrupt their family routine, this will only add stress, frustration, and damage family harmony.

Should parents, elderly and women feel guilt for using disposable diapers or sanitary pads?

While energy intensity varies during the life cycle of diaper types, the overall energy use is essentially the same. In the UK, taking into account the energy production profile, the greenhouse gas effect of a baby using diapers for 2.5 years corresponds to about 3,000 kilometers of driving, or the equivalent to the amount of emissions generated by flying Finland's environment minister on a commercial flight to Brussels and back.

Each society determines its energy production profile. The Ministry of the Environment is guilty for shelving of three energy projects that would have substantially reduced Finland's greenhouse gas emissions:

- The Vuotos hydropower project
- The Pori offshore wind farm project
- The Vantaa waste incineration facility

Any one of these projects would have cut the greenhouse gas emissions of Finland by an order of magnitude more than what is generated by the use of diapers and sanitary pads by Finns. Moreover, the emissions related to diapers are inevitable, no matter if disposable or reusable products are involved.

On the other hand, Europe's low birth rates could endanger the well-being of current generations. Subjecting mothers to behavior that badly suits their lifestyle and possibly endangers the health of the baby will do little to increase the birth rate in Finland.

While there is no justification for parents, seniors or women to feel guilty about using disposable diapers, sanitary pads or tampons, they might be justified in feeling manipulated. The people doing the manipulating use shame about natural functions to gain power in the name of sustainable development – and they do it on taxpayer money.

APPENDIX 7: THE ENVIRONMENTAL POLICY PORTION OF THE GOVERNMENT PROGRAMME OF PRIME MINISTER MATTI VANHANEN´S GOVERNMENT ON 24 JUNE 2003

10 ENVIRONMENTAL POLICY

The aim of Finland's environmental policy is to consolidate Finland's status as an information and skills-based society known for its high level of environmental protection, whose competitiveness derives from fulfilment of sustainable development criteria in consumption and production.

Finland is an active participant in international cooperation to solve global environmental problems and to promote international environmental policy. Environmental values must be taken into account in developing the rules of international trade. Finland is in favour of a strong UN environmental organization. The principles of sustainable development are fundamental in Finland's action related to the management of globalization.

In order to slow down climate change, the commitments of the Kyoto Protocol will be implemented in accordance with the National Climate Strategy, and rapid ratification of the Protocol will be promoted. Finland will play an active role in launching a new round of negotiations aimed at halting climate change and involving all countries.

The Baltic Sea Protection Programme will be continued. Efforts will be made to have the Baltic Sea designated a Particularly Sensitive Sea Area (PSSA). The Government aims to enhance the significance of the Baltic Sea within the European Union, particularly in the Northern Dimension Action Plan and the Environmental Partnership Fund. Eutrophication will be curbed, for instance by reducing pollution loads from agriculture and communities and by investing in the reduction of harmful emissions and discharges from neighbouring areas. Risks caused by oil and chemical shipping and other hazardous transportation must be reduced. Efforts will be made to speed up the preparation and enforcement of international technical regulations, particularly regarding shipping in winter. Inputs will be made to improve preparedness to combat oil pollution in neighbouring areas. A new multi-purpose icebreaker equipped for oil and chemical pollution control will be acquired to improve oil pollution combating capacity. Ways and means of setting up a centre of expertise in oil pollution control will be investigated.

Practical implementation of the action plan formulated at the UN World Summit on Sustainable Development in Johannesburg will be promoted. A national intersectoral programme of ecologically, socially and economically sustainable production and consumption patterns will be drawn up. Environmental education will be promoted in this programme. Finland will play an active role in preparations for an international framework programme for sustainable production and consumption. The aim is to increase efficiency in the use of materials and energy throughout the life cycle of a product. Production and expertise based on environmental technology will be promoted.

The structure of taxation will be revised so as to promote sustainable development. Ecological tax reforms will reduce the use of non-renewable natural resources and prevent environmental damage. At the same time, the recycling and ecological efficiency of products, their consumption and energy use will be promoted. Ways of cutting subsidies detrimental to the environment and to sustainable development will be explored.

The total volume of municipal waste will be reduced, and waste should increasingly be used as raw material and as a source of energy. Both economic and technical incentives will be used to reduce the volume of waste.

An environmental guidance system based on excise tax will be developed for beverage packagings.

The adverse effects on the environment of the final disposal of non-recyclable waste will be minimized. The polluter-pays principle will be extended to more product groups, and the responsibility of the trade sector for packaging waste will be increased. The recovery and use of landfill gas for energy will be improved and expanded. A comprehensive system for the separate collection and treatment of biowaste will be introduced.

A national programme on hazardous chemicals will be drawn up. The precautionary principle will be emphasized in order to minimize any unforeseen adverse effects of new products. A Government resolution on a national noise abatement action plan will be issued.

The quality of groundwater will be maintained and the restoration of contaminated soil will be promoted.

The environmental quality of cities and other urban areas will be improved, with particular attention to the health of children and other special groups. To this end, fine-particle emissions from traffic and incineration will be curbed more effectively. Nearby natural environments and recreational areas will be made more easily accessible, for instance by setting up city parks. In land use planning, measures promoting the preservation of valuable natural and cultural environments will be highlighted.

Nature protection programmes will be implemented in accordance with the funding programme approved in 1996. Nature protection funding will be re-evaluated in 2005. The action plan for forest biodiversity conservation in southern Finland will be implemented. Nature reserves will be properly managed. Nature tourism and outdoor recreation will be diversified to create jobs.

The designation of areas to be included in the Natura 2000 network will be completed in cooperation with the European Commission. The management and use of Natura 2000 sites will be promoted in cooperation with landowners and local actors. The maintenance of valuable natural and cultural environments created by traditional agriculture will be safeguarded as part of agricultural policy.

Regional environment centres will have a more prominent role as regional development experts. Permit and other administrative procedures will be speeded up, and services will be made more customer-oriented.

The National Action Plan for Biodiversity will be revised in 2005.

Finland will contribute actively to the tightening of legislation to prevent cruelty to animals and its enforcement in the European Union. Animal protection monitoring and enforcement of legislation will be intensified in Finland.

Testing on animals will be reduced. Animal protection organizations that respect the rule of law will be supported.