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Back to Mother Nature

Can nature be imitated? Almost everywhere you look you find that where the conditions are right, life will manifest itself ... in a variety of life communities that are adapted to precisely that environment: swamp vegetation grows in swamps, silt loving plants grow near seas, and dune vegetation thrives in dunes. What we cannot do is to actually construct these life communities. But we CAN create favorable conditions to stimulate and possibly guide specific developments.

10.1 Nederland without people

Just imagine that nobody had ever lived in Nederland. In that case over 60% of the country would have been an unspoiled delta with magnificent, unbridled nature. We would encounter dunes at all stages of development, and behind them lagoons and creeks allowing the salt tidal water to penetrate deep inland and which would be surrounded by salt, brackish and fresh water marshes. Further inland we would find fresh marshes with vegetation on peat or fens, rivers meandering through river forests harbouring a wide variety of life forms and life communities.

The high land in the eastern and southern parts of our country would have been wet in winter and dry in summer.

Except of course in places where there is insufficient drainage. There peat would have been formed on sandy substrate. The drier high ground would almost completely be covered by primeval forest.

10.2 Creation in a delta

Back to reality. People *did* live here, quite a lot of them in fact. In Nederland some 60 million. Most of them lived in the last two centuries. And all those people have made their marks. In the low part of our country they revealed themselves as really being a race of true beavers. But also the higher grounds were cultivated. And now the sea is in focus. Man has an uncontrollable urge to influence his own habitat.

In this respect Man is no different from other forms of life. But Man's intelligence does make a difference. No other life forms use such advanced technologies on such a scale and in such short periods of time.

This intelligence shouldn't be overrated either, because too few of us realize that Man is merely part of a system to which he owes his very existence. Socially and ethically Man has not been able to keep up with his technological achievements. History teaches us that what Man *can* do, he sooner or later *will*. And sometimes it can be downright foolish, extremely harmful and quite unethical. From his behavior it appears that more

Picture 10.1 Map of Nederland at the beginning of our era.



Picture 10.2 Trenches penetrate far into the land.



often than not he places a higher value on money and things material than on life and the ecosystems in which this life enfolds. Whatever the case may be, we cannot pretend Man isn't there, so we must cope with this fact and obviously also authorities must take it as a starting point. The key question is not "may we allow a society to grow and change" but how that growth and change should be realized in a sustainable and responsible way.

Unfortunately only very little remains of the original landscapes.

Almost all the ecosystems of the past have disappeared. We simply do not know them anymore. Field research and comparison between areas only give us vague ideas what



Picture 10.3 New landscapes replace the original ones.

these systems must have looked like. But new landscapes such as polders, peaty lakes and moorland have taken their place. Many of them really deserve to be preserved from the point of view of protecting nature or culture. So if Man cooperates sensibly with nature and takes his time he is capable of establishing conditions leading to valuable results. A nation cultivates the art of *conditioning* – that is, the ability to create the right conditions.

Perhaps more accurate than *conditioning* would be to use the term “guided ecosystem development” – analogous to the notion of “guided economy” – since there is more to it than just a one time operation when setting out the starting conditions. It actually is more about influencing the way the landscape develops itself.

10.3 Look around you

The Dutch landscape has mainly been shaped by human interference. We owe the rich variety of landscapes that presented themselves to us at the beginning of the 19th century to the many generations before us. Leading scientists are of the opinion that this cultured landscape has greater numbers and a greater variety of flora and fauna than the original natural landscape (which in no way is a negative judgment on the latter!). Sources such as “De Nederlandse Landschappen” reveal the *culture landscape* in all its versatility and beauty.

Apparently Mother Nature reacts to new conditions for life. Her reactions can be most surprising. Take for instance the moors of Gelderland, Brabant and Drenthe, each with its own particular characteristics; or think of the “flower dykes” or the hedge landscape of Zuid-Beveland; or the cart track fields in Zeeland, the clay holes in the Ooypolder. Think also of the remains of creeks, the “weelen” (waterlogged holes that form when dykes collapse), small ditches, dyke slopes, shipwrecks and bridge pylons. Think, too, about the more recent example of the Rammegors (along the Schelde-Rijnkanaal) used to dump dredging sludge – a promising area, whose management has been transferred

to nature defense authorities.

Let's have a closer look at examples of "unconscious conditioning". First the Drowned Land of Saeftinghe, an area of salt marshes of pristine beauty.

This area was one of the numerous parts of Nederland "wrestled from the clutches of the sea" and then cultivated by Man. In 1570, during the infamous flood of All Saints' Day, the dykes collapsed. They were fixed in a makeshift fashion but before even 10 years had passed, these dykes were opened again by Marnix of St. Aldegonde who decided on this drastic measure to drive the Spaniards out of our country.

The simple fact of allowing the tide back into the area was sufficient to initiate a transformation of the landscape that led to the present valuable salt marshes. Unwittingly Man determined the new limiting conditions for the environment and Nature did the rest. By today's standards Marnix would have been an appreciated natural cultivator!

Let's now cast our eye toward the so-called "inlagen" (inlays) at the southern side of Schouwen Island, or on the northern side of Noord-Beveland. In the one, salt vegetation flourishes, while the other's main function is that of providing water birds a dry place to rest during high tide, which makes it quite valuable from an ecological point of view ecology. So what's going on here? When a sea dyke is too porous below the water line, then during high tide salt water will seep inside and be a threat to the land inside. The dyke is liable to collapse.

In the previous century for added security a spare dyke was constructed at some distance inland. This dyke was called an "inlage" dyke and the areas between the dykes was called the "inlage". The inlay was quite silted up and consequently was covered with "salt tolerant" vegetation. In this special environment the Nordic Vole, a kind of mouse, can still be found, though everywhere else in fresh water surroundings it has been driven out and replaced by the Common Field Mouse.

Another example of unwitting conditioning can be found in the hard substrate of the dyke slopes in the intertidal area of estuaries, such as the Oosterschelde and the Westerschelde. **I am referring to the dyke bodies that have been fortified by placing Vilvoorde stones or Belgian basalt blocks** from just under the low tide line to just above the high tide line with the intention of providing better resistance to the attacking waves.

To an entire life colony these stones represent "to be or not to be". All kinds of organisms that depend on "rock environment" and could not survive on our sandy beaches exist quite comfortably here. Especially these "hard substrate" species substantially enhance the diversity of life forms in an estuary. The past 30 years have seen hundreds of hectares of hard substrate added to the existing environment. The concrete pylons of the storm defense or those of Zeelandbrug spring to mind, or the vast surface of bottom protection that was dropped in the Oosterschelde to support the storm defenses.

Within a year these hard substrates were covered with complete societies thriving on coastal rocks. Sometimes we did the right thing accidentally, for instance when we used Vilvoorde rock. At other times we flagrantly broke ecological laws, for instance when we poured asphalt in between the basalt blocks.

Though the quantity of life (biomass) in the estuaries is relatively insignificant the sea presents a totally different situation. A rough calculation of the size of biomass on the

approximately 50,000 wrecks, thousands of kilometers of pipeline, a multitude of off-shore installations and the like, shows us that we are talking about an essential part of the total Noordzee biomass. Global estimates have it that it could make up more than 15% of the total. Every sea angler knows that the sea is particularly generous when you do your fishing above a wreck. Quite a lot of professional fishermen like to cast their nets near off-shore installations.

Examples of *unconscious conditioning* do not necessarily have to be found in water surroundings. A random pick: the polders at Kinderdijk in Zuid-Holland, in the pretty green heart of this province; the grassy peat marshes in Noord-Holland; the clay holes in Zeeland country which were the result of clay being required to cover the dyke bodies; the branches of rivers that were cut off; or the chalk landscape in Zuid-Limburg, to name just a few.

The present quality of the Oosterschelde hardly bears thinking about if the Kreekrakdam and later the Volkerakdam hadn't been built. The seriously polluted Schelde, Rijn and Maas would have happily spread out their toxic contents all over this wonderful estuary just as they are allowed to do now in the Westerschelde and in the Haringvliet. Unwittingly Man created a new substrate and Nature took grateful advantage of this new situation. With great love, fantasy and understanding Mother Nature continued to sit down at the table of her creative children. Even though the limiting environmental restrictions were not set with this result in mind, the effects were no less interesting.

The results we can bring about accidentally can obviously also be the *premeditated* target of our technical and ecological planning.

Put differently one might say that Mother Nature, old and wise, extends her hand to show us how we should and how we shouldn't interact with her.

All we have to do is to listen and pay attention and follow her advice.

We must simply "be her guests". Let's not forget that she has 3 billion years more experience than we have, and was doing a wonderful job long before Man entered the scene. In fact she produced us!

Nederland has actually started to follow this path. We try to play an active part when in one of our major hydro-technical projects we come across one of the many possibilities to do so. This approach has in the meantime produced some interesting results.

The Oostvaardersplassen, the Grevelingenmeer, the Oosterschelde and the Volkerakmeer spring to mind. We must make a pact between technology and ecology which will be rewarding to both Man and Nature. The future looks bright for ecotechnology and guided ecosystem development!

10.4 What went wrong in the 20th century?

Though the effect of human interference was sometimes positive, most of the time it went wrong – terribly wrong. Natural decay really accelerated sped up with the industrial revolution, urbanization and the rapid development of technology.

In the 20th century you can add explosive growth of the population to that list. The landscape was given a really drastic makeover. New cities sprung up, new roads unfolded and new industrial sites were mapped out. There seems to be no end to the need of a Dutchman to travel. Highway after highway was realized at any cost. Rationalization of

Picture 10.4 The Drowned Land of Saeftinghe.



Picture 10.5 Example of an "inlage".



agriculture led to reallocation of land, to “controlling” water levels, optimizing the toxic factor of fertilizing and the increasing demand for pesticides. The process of “optimizing” was almost exclusively judged from an economic viewpoint. Relations between ecology and economy were not recognized. The landscape degenerated to merely being a production factor, fundamentally ignoring its value for other aspects of ecosystems than the economic value for mankind. After World War II everybody was concerned with “reconstruction”. There was no limit to the consumer’s appetite for luxury goods and a luxurious life-style.

New materials saw the light that Mother Nature was not equipped to handle. Excess and squandering became the norm. Waterways turned into open sewers. Soil and air quality degenerated as well.

The elementary quality of nature in Nederland was severely compromised. We were not able to control “progress”. Here we are not alone as this regretful process can also be observed in many other places.

And also almost all rivers on Earth and their estuaries were compartmented. They were “treated” to dams, dykes, canalization, normalization, their flows reversed, and they were robbed of their living embankments.

Fish could no longer reach their breeding grounds that were destroyed by the quest for raw materials. The submerged gravel, once the lining of the hideouts of breeding fish, is now locked up in the concrete of the millions of human “nests”. Fortunately our society is slowly realizing this fallacy and making amends. At some point in time, ecology will get priority over economy.

10.5 Salvage all we can

Many things of beauty have been lost. Landscapes of another era were connected to the economy of those bygone days. This cultural heritage was steamrolled with the same lack of compassion as the original natural landscapes were. Many of these landscape elements require a long time to mature. You cannot construct them instantly. The landscapes are irreplaceable.

Disturbed *podsol* profiles and flattened salt marshes have lost their variations.

And this variation happens to be the key to the multitude of life communities and life forms. Can't this be undone? Is there no way back? Could new ways bring back the old?

No, what is lost, is lost forever, just as when a loved one dies and only leaves a unique memory for those who stay behind. But life goes on. New life announces itself, fragile and delicate to start with but with attention, care and the right management it might



Picture 10.6 Salt-/fresh separation lock in the Philipsdam.

develop into something new, something vital, something grand. And that is where we are offered an opportunity. The same is true for landscapes.

Change is a characteristic of life that cannot be denied. This is the secret of the new way of dealing with nature in cultured cultivated landscapes. Without denying the value and the significance of the remaining old landscapes, we must focus on the future and the many opportunities still open to us.

The new slogan should be: *“What we were able to demolish and destroy bit by bit over a century we must also be able to reconstruct bit by bit over the next century.”*

The story that follows is not a cure for all problems, but it does illustrate ways to return to nature’s values in our country.

10.6 A wet revolution

Water and landscapes are now seen in quite a different light than a few decades ago. What developments in thinking and acting were the cause of this different view? What knowledge can we derive from the Zuiderzee projects? How can we put this new knowledge to good use, here and elsewhere?

No more than 20 years ago water was solely regarded in relation to its use to Man. Focus was also mainly on fresh water. Our Water White Paper of 1968 (nota Waterhuishouding) even went as far as referring to salt water as “useless”.

Salt water was tantamount to bad quality water. Probably then we mainly had agriculture and horticulture in mind as well as the affair of the discharges by the French potash mines in the Rijn. It goes to show that water was merely seen as a raw material for human consumption.

Up till then, about 1968, Man was the self proclaimed focal point, but in the seventies gradually the system and all its possibilities were allowed to take up a central position. Careful considerations brought requirements and possibilities into harmony with each other. Conflict that is embodied in “Man’s wishes have absolute priority, and the system should follow, no matter what” was replaced by the search for a fruitful “cooperation between Man and the system”.

The current situation is that we no longer oppose nature and we are now extending it a helping hand. This help or guidance is given by creating favorable development possibilities. This is called “conditioning”, as mentioned earlier in a different context. We possess knowledge of ecological processes and have the technical means to actually guide the system in a desired direction. A case in point is the salt/fresh water separation locks in the Philipsdam, the Haringvlietsluizen, the locks of the Afsluitdijk, the inlet/outlet sluice in the Brouwersdam and the storm defense in the Oosterschelde.

But I am also thinking of the mathematical ecosystem models that enable us to open “a dialogue” with the system. That is the way we work with the Grevelingenmeer. The result is astounding.

Management is limited to setting essential environmental conditions. For a salt water lake those conditions would typically be salinity, water level, the time of residence, and the connection possibilities of larvae with the open sea.

Clean clear water with healthy and flourishing salt water life communities. Extensive shallow areas, harbouring a myriad of possibilities, both under and above the water. The

first sign are the water birds. Grevelingenmeer has in a short time become a wetland of European interest.

Notwithstanding a relatively high phosphate content, the water of the Grevelingenmeer is crystal clear with a visibility up to 8 meters deep, also in summer. Owing to a high nutrient level and because the system is without toxic materials the Grevelingenmeer is highly productive, yielding fat eel, oysters and mussel seed.

The lake is surrounded by sandbanks that have fallen dry and salt marshes that show quite interesting developments. The dry areas have developed vegetation that is still maturing. The sandbanks now permanently dry are showing hundreds of hectares of growth which reminds us of the wet dune vegetation of days gone by. Plant species are found such as Black Sedge, Early Marsh (Meadow) Orchid, Marsh Helleborine, Marsh grass of Parnassus and European Centaury.

This type of environment has almost been made extinct by drinking water projects and other infiltrations of the dunes.

The amusing part of all this is that Man has become an integral part of the ecosystem. He has a vested economic interest in generating income from fishing and recreation. A rough estimation of the economic value comes to some €50 million per year. And even the stressed city dweller can relax there.

Nature preservation organizations are lining up to be entrusted the management of the potentially valuable river foregrounds. The lake is by no means the final goal but developments are hopeful indeed.

What are the “lessons learnt” from the Grevelingen project?

1. A salt lake is a viable type of environment. This breaks radically with the trend of all previous Dutch views on the subject.
2. The new environment is given a long term perspective if new possibilities are embraced in the planning and organizational stage.
3. The design of locks and dams as well as the management systems must be such that they can cope with new transformation processes.
4. All governmental bodies concerned must willingly participate in the new, harmonized, intended control.

What are the perspectives of this train of thought?

It seems that we can always promise: “Just tell me what you want, and you can get it.” “Would you like your marshes salt or fresh?” “Show me where rules allow it, and there will be no technical problem preventing us from realizing whatever you want.”

We keep finding: “Introduce favorable environmental conditions into the system and Nature will pick them up with amazing speed.” A wide variety of approaches is possible. Marsh formation takes place in the Oostvaardersplassen, in the Markiezaat near Bergen op Zoom and in the Volkerakmeer. The environment has undergone drastic changes and the system has gradually adapted itself to the new circumstances. In the case of the Markiezaat and the Volkerakmeer the tide disappeared and water became fresh. The water level rises and falls with controlled frequencies and values.

In the United States experiments have been conducted on a large scale how we could successfully assist in the creation of *salt* marshes.

There is no reason why the methods that have been developed in this way could not be employed in Nederland.

And it is not at all about how to “build” new marshes. On the contrary, it is again a matter of creating the circumstances that will *favor* their creation.

All these examples illustrate that theory and practice in these fields are in a state of flux and that all kinds of changes are imminent.

The willingness to tread new paths is clearly on the increase. This does not mean that we are denying our age old traditions in the field of water management.

In the seventies and well into the eighties, you could see a new trend taking shape concerning conditioning. Water, with all its uses and possibilities, was rediscovered as a system. Water systems seemed to offer better prospects than reclamation, or at least were able to compete successfully.

Just think of the discussions about the Oosterschelde and the Markerwaard.

So it is no longer merely conditioning “earthy” systems, such as reclamation of the IJsselmeerpolders. Fresh, brackish and salt water systems all started to be regarded as fully fledged systems to build and to manage. Even controlled tide systems have come of age today. The focal point is no longer large bodies of water such as the IJsselmeer and the Delta waters that are already changing along these lines.

It is about all Dutch waters and all areas where water plays an important part, such as low moor polder areas in Noord-Holland, the polder landscape of Zuid-Holland, extensive lake areas such as the Nieuwkoopse plassen (lakes), the Reeuwijkse plassen, the Vinkeveense plassen and the Loosdrechtse plassen. This is not just a matter of a little icing on the cake. No, sir! Within Dutch proportions these are very large areas.

In 1970 the principal outlet to the sea of the Rijn and the Maas was cut off by the construction of the Haringvlietsluizen. A river estuary turned into a fresh water lake.

This separation had enormous ecological consequences: fresh water instead of salt water and no tidal motion to speak of.

The separation caused the sedimentation in the hinterland to increase markedly. But this increase was expected and calculated.

A new balance will eventually be struck between the present dykes and a meandering river, edged by fresh water vegetation and river forests, a landscape Nederland has known in its early years.

Within limits we are able to guide this landscape formation with the existing available infrastructure such as for example the Haringvlietsluizen.

In the future the Haringvlietsluizen will not only function to ward off high water levels and watering out the surplus of fresh water coming off the land, but also to guide the current transformation processes in the Haringvliet/Hollandsch-Diep area, yes, even – within certain limits – to realize a targeted management for the whole coast. It is a nice example of guided ecosystem development. Potentially the fore-delta could grow to become one of the most significant estuaries of Western Europe. The investigations by Delta Instituut voor Hydrobiologisch Onderzoek at Yerseke bear out the predictions we made at the time concerning the expected decline of the stilts (a bird class) in the Oosterschelde area, after cutting off the Volkerakmeer. In time the fore-delta might compensate us for this loss.



Picture 10.7 The starting phase of a wet dune valley at the southern end of the Oosterschelde defense. A good example of constructing alongside together with Nature.

10.7 Conditioning? Yes, of course!

We must map out a completely new course. The new strategy might become: “Nederland is country of water. Emphasize this characteristic.”

Countless remaining elements of this Man-introduced valuable landscape can still be found. The compartmenting of Nederland is such that measures can be taken in one area even though problems in other parts have yet to be resolved.

Let’s just take a close look at what can be achieved in our own domain.

Seize the opportunities to act in accordance with the countless new possibilities our watery land has to offer. Hitch onto the young landscapes. If only we allow the new landscapes sufficient time to mature and become fully grown. What is after all hundred years between friends ...?

If we act in this way we are creatively investing in the future.

Try, wherever the present landscape makes this possible, within Man-controlled environmental circumstances, to recreate elements of the original wild landscape.

I believe that a lot more can be done in this area than we now believe is possible, if only with regard to the new marshes.

Take a helicopter view. Let’s not just concentrate on valuable small parcels that we can probably best protect against Man by putting barbed wired around them. Also devote sufficient attention to the large scale new areas. Allow Man to play his rightful role. Don’t isolate him but integrate him in the landscape. If modern Man can be made to realize his interest, he can also be convinced to make the right sacrifices.