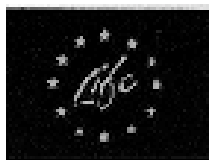




**MINISTRY OF THE ENVIRONMENT
DIVISION OF WATER AND RIVERS
RIVER REHABILITATION ADMINISTRATION**

REHABILITATION AND DEVELOPMENT POLICY FOR ISRAEL'S RIVERS



June 1999, Jerusalem

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FOR ISRAEL'S RIVERS**

POSITION PAPER

**PRESENTED TO THE EDITORS OF
THE NATIONAL OUTLINE SCHEME FOR
DEVELOPMENT AND BUILDING (NOS 35)**

Moti Kaplan

Jerusalem, June 1999

REHABILITATION AND DEVELOPMENT POLICY FOR ISRAEL'S RIVERS

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July 1999

Over the past few years, river rehabilitation has emerged as one of the central issues of environmental protection in Israel.

In addition to preventing waste and pollutant discharges to riverbeds, rehabilitation calls for assurances of adequate water sources, in terms of both quantity and quality, preservation of habitats and special sites, and development of recreation and hiking points in the environs of rivers.

Moreover, the river, as a drainage base, is a sensitive indicator of the overall environmental condition of the entire watershed, and serves as a foundation for open spaces and green lungs which act as buffers between or around built urban areas.

All these factors make it imperative to integrate between river rehabilitation policy and the background documents and provisions of the Integrated Outline Scheme for Development and Building in Israel – NOS 35.

The aim of this document is to present the guiding principles for river rehabilitation, as formulated by the bodies which compose the Israel River Rehabilitation Administration, in order to transform them into an integral part of the objectives of NOS 35.

I would like to extend my thanks to Menachem Zaluzky for “pushing” for the integration of river rehabilitation and national planning, to the members of the steering committee for planning of the Israel River Rehabilitation Administration for their beneficial comments, to the Keren Kayemet LeIsrael (Jewish National Fund) for its cooperation, and to Moti Kaplan and Amit Segal for the preparation of this study.

Sincerely,

*Dr. Yeshayahu Bar-Or
Director, Division of Water and Rivers
Chairman of the Steering Committee for Planning of the
Israel River Rehabilitation Administration*

All Rivers

When They Travel the Earth

Are Good and Blessed and Sweet

And Bring Pleasure to the World

(Pirkei de-Rabbi Eliezer, 9)

INTRODUCTION

This booklet, in condensed form, is included in the development plan of NOS 35, the Integrated National Outline Scheme for Development and Building. The provisions of the plan, as they appear in chapter 9, were presented to the National Planning and Building Board for approval. It is assumed, however, that this version may undergo further revision before final approval.

Numerous professionals participated in the preparation of this study, provided additional material and comments, and contributed to the final version. Dr. Yeshayahu Bar-Or, head of the Division of Water and Rivers of the Ministry of the Environment, and Mr. Giora Shaham, former head of the River Administration, served as a steering committee and accompanied the work in the form of ongoing comments and guidance. The plan provisions were formulated in their current version on the basis of detailed drafts which were prepared by Arch. Amit Segal. Others who participated in the process included Mr. Gideon Witkin, Director of the Land Development Authority in the Keren Kayemet LeIsrael; Mr. Moshe Cohen, Head of the River Administration; Mr. Menachem Zaluzky, Planner in the Jerusalem District of the Ministry of the Environment; Mrs. Binat Schwartz, head of the Long-Term Planning Section of the Planning Administration in the Ministry of the Interior; Dr. Dan Rosenzweig and Mr. Zvi Rebhun of the Soil Protection and Drainage Division of the Ministry of Agriculture.

To all a special thank you.

REHABILITATION AND DEVELOPMENT POLICY FOR ISRAEL'S RIVERS

1. FRAMEWORK

Since its establishment in 1993, the Israel River Rehabilitation Administration initiated river rehabilitation plans on a wide scope. Its activity is reflected in the ever increasing awareness of the subject among authorities, planners and the general public. The ideas and plans on river rehabilitation which have been advanced in recent years provide a conceptual platform, basis and background for reference by the national outline plan.

The purpose of this document is to formulate a **comprehensive national policy** for river rehabilitation, through the assimilation of the subject in NOS 35, the Integrated National Outline Scheme for Development and Building. The document points to the centrality of the subject to open spaces and reveals the interconnection between the watercourse and its surrounding area. The paper presents an integrative planning conception on the national level, whose principle parts were integrated in the development plan of NOS 35. This conception should serve as a basis for river planning on the regional and local levels.

NOS 35 incorporates river planning within its treatment framework for open space fabrics and urban fabrics and links rehabilitation plans with physical-spatial planning. The land designation map in the outline plan displays the national river system.

The plan is comprehensive in its relation to the national river system, on both sides of the National Water Divide: coastal rivers, Kinneret Basin and eastern basin rivers, Arava and Gulf of Eilat rivers. The provisions of the plan relate to a riparian belt which includes the riverbed (watercourse and banks), the immediate vicinity of the river and the areas impacted by it.

NOS 35 calls for the preparation of a master plan and outline plan for each river and lays out the principles for plan preparation. These include: assurance of sufficient space to regulate flows, including flood risks; river rehabilitation and restoration of landscape and natural values; creation of an open area around riverbeds; and preservation of the continuity of green spaces, which will allow for recreational activity along the watercourses. The exact boundaries of these areas will be determined in detailed plans.

2. RIVER REHABILITATION IN ISRAEL

River and spring systems have been severely damaged in Israel as a result of the intensive exploitation of the country's water resources. Over-pumping of groundwater and impounding of springwater have blocked the natural flow of rivers upstream. As a result, watercourses which once abounded with water, vegetation and wildlife have been transformed into barren and dry channels. Moreover, with the growth in population over the years, public authorities and private bodies began discharging wastes and municipal and industrial wastewater to riverbeds. Pollution at one point then impacted other points along the river and adversely affected the entire ecosystem. Rivers were thereby transformed into a nationwide network of waste and pollution conduits. To a great degree, rivers now function as ecological and aesthetic nuisances which pollute the environment, groundwater and the open landscape. Heavy damages to urban and agricultural infrastructures, as a result of river flooding during heavy rainfall, is yet another dimension of the problem and underlines the urgent need to regulate and rehabilitate the country's rivers.

River rehabilitation and recovery of the river's environmental and social functions have taken an increasingly important place on the public agenda in recent years. As a result, rehabilitation plans have been initiated and implemented by the Israel River Rehabilitation Administration and the Yarkon and Kishon Authorities, in cooperation with drainage authorities.

River rehabilitation plans are conducted on different levels – from specific sections of rivers to entire drainage basins. The planning framework includes hydrological aspects – regulation of river flow for drainage purposes and flood risk mitigation; environmental aspects – rehabilitation of the natural and landscape system, nuisance and pollution prevention, water resource surveys, and open space conservation alongside rivers; and social aspects – leisure, quality of life and tourism.

Establishment of a framework and work plan and a link between comprehensive national planning and local planning are vital for the success of the river rehabilitation project.

River rehabilitation plans are based on the assets of the river and its central place in the physical environment and in human consciousness: rivers – alongside their function in regulating flow – have ecological, social and cultural value. The river, along with its dynamics – flowing water, diversity of flora and fauna and seasonal changes – is perceived as a picturesque site endowed with landscape and aesthetic value. These values are also anchored in cultural and traditional contexts which are easily grasped by the public and the relevant authorities. Restoration of the water – even if only partially – to rivers which once flowed in the past will bring about climatic and landscape impacts of the highest importance and will be of high value in terms of contribution to leisure, quality of life and tourism.

3. FORMULATION OF A COMPREHENSIVE NATIONAL CONCEPTION

NOS 35 presents a comprehensive planning framework for Israel's rivers as a central component of its policy on open spaces and the spatial structure of the country. According to the outline scheme, the national river system will serve as an axial network, serving central functions of flow arteries, natural values, aquatic habitats, green lungs, buffer zones and leisure and recreation areas for the population. The national river system will reflect the landscape diversity of the different areas of the country and will accentuate the singularity and contrast of the country's landscapes.

This conception was consolidated into a physical system, which defines the main watercourses, the open spaces with a direct affinity to them, their functions and inherent potential, and the flow lines and interface between urban settlements and rivers.

NOS 35 introduces a planning principle whereby development and building which do not have an affinity to the river will be limited while preference will be given to land uses with an affinity to it – in terms of conservation of landscape and natural values and cultivation of leisure and recreation uses. This principle is similar to the policy approach of NOS 13 (National Outline Scheme for the Coast) which distances uses which do not have a direct affinity to the shoreline or which are not vital to it from the shoreline.

3.1 *Rivers at the Heart of the Country*

NOS 35 accords special attention to coastal rivers at the heart of Israel, especially in sections which interface or are adjacent to dense urban settlements on the coastal plain.

The central region of the country is characterized by an accelerated process of construction and expansion at the expense of agricultural areas. This process is accompanied by a trend of “unfreezing” agricultural areas in areas of demand and transforming them into construction and development designations. To date, agricultural values have helped to block the encroachment of building to cultivated areas. However, the decline of agriculture coupled with the high demand for residential areas in the central metropolitan area of the country have made it increasingly difficult to preserve a reasonable configuration of an urban system, which is integrated with open areas. There is real concern that urban sprawl will extend to the entire heart of the country – leading to the disappearance of green lungs, intermediate areas and areas for leisure and recreation for the benefit of the population.

NOS 35 presents a planning conception which breaks up the continuous line of built-up areas which endanger the coastal plane. The plan designates intermediate areas – green buffers which are in effect wide-open agricultural areas which encircle the watercourse and create open spaces which divide between urban formations. These areas have high specific value, by virtue of their proximity to large population concentrations. Moreover, these areas can be imbued with significance and content – as areas of potential leisure and recreation for the benefit of population of the central

region of the country and as areas which will halt uncontrolled urban expansion. These spaces also have an additional environmental value as sites of recharge and infiltration to groundwater of the coastal aquifer.

The conception of watercourses as buffer zones between built areas was originally proposed in the 1950s, in Aryeh Sharon's plan "Physical Planning for Israel." It was renewed in NOS 22, the National Outline Scheme for Forests and Afforestation, and NOS 12, the National Outline Scheme for Tourism and Recreation. This configuration is also proposed in DOS 1/21, the District Outline Scheme for the central region and in the master plan for the Tel Aviv metropolitan area.

Several distinct intermediate areas between coastal cities have been identified in Israel: the Alexander River-Hadera River area in Emek Hefer between Netanya and Hadera; the Poleg River area in the region of Gva'ot Haruzim, between Netanya and Herzliya; the Yarkon area which separates between Kfar Sava and Petah Tikva; the Ayalon River area which separates between Tel Aviv and its surrounding cities and Ramle, Lod and Holon; the Soreq River area which separates between Rishon LeZion-Rehovot and the Ashdod-Gedera bloc.

Figure 1 presents the rivers of the central region and the open spaces surrounding them which serve as buffers between urban formations.

The conception presented in the plan seeks to link the watercourse (longitudinal dimension) with its surrounding space. The river requires this open envelope for ecological-environmental considerations: floodplains must be preserved so as not to transform the river into a "flow conduit" or an "open canal" (as is the case today in the descent of the Ayalon River). Above and beyond this, the river should serve as a base for the open space in its vicinity. This open area will include land uses for the supply of recreation, sport and leisure services to nearby populations and a park featuring a wide array of activities, such as golf, open amphitheater, open museums, nature sites, and reconstruction of traditional agriculture – all of which require wide-open spaces. These land uses will converge and face the river – the central axis which connects them to it. Open spaces will have the appearance of open rural landscapes – rural settlements dotting agricultural fields. In some areas of the country, such as the orchards of the Sharon region, rural landscapes lend the area its singular character which, in the case of the Sharon, reflects the early days of settlement in the country. The river provides a common environmental motif to land uses in its environs. Without a dominant element which finds physical expression in the field, such as a watercourse, the creation of the proposed system would be more difficult.

Open spaces in the vicinity of the river should be subject to special planning and a defined statutory status that will prevent urban encroachment and blurring of the green buffer areas. This conception is true for all rivers of the central region: Hadera, Alexander, Poleg, Yarkon, Ayalon, Soreq and Lachish, which are linked to agricultural expanses. The scope of space, which should be preserved in the river area system,

may be anywhere between tens of square kilometers to hundreds of square kilometers, in the different river units.

The above areas are included in the scale maps of NOS 35, in the context of an **integrated conservation fabric**. This determination is meant to emphasize their importance and to equate it with natural resource areas which are included in NOS 31, the National Outline Scheme for Nature Reserves and National Parks. Their importance stems from their function in the system – creating the required buffer between coastal cities and potential for leisure activities for the benefit of the population in the heart of the country. Between these open spaces, “landscape complexes” have also been integrated, which emphasize, *inter alia*, the landscapes associated with the agricultural and settlement heritage of the Land of Israel.

These expanses represent “rungs of a ladder”, which are connected, from the east, to green open spaces along the hill axis, and from the west, to the coastal strip. This configuration assures continuity and spatial order in Israel’s open space conception.

3.2 *Rivers in an Urban Environment*

The rivers which descend from mountain to sea transverse the coastal plain, along paths which run in close or immediate proximity to population centers, and at times – within settled and built areas themselves.

A river which passes near a settlement may function as a green and open path, within the built area, and as an environmental park, which links the city to the open space. The values of the river’s path must be highlighted: the dynamics of a flowing river in the heart of an urban area, the topographic changes caused by the river and its banks, the possibility of creating a promenade, bridges, hiking and resting trails along the banks, the potential of holding events and cultural appearances in the area, etc. Large rivers in the world’s major cities already serve such a function, and in Israel this is already the case for riparian parks such as the Yarkon Park in Tel Aviv and the Lachish Park in Ashdod. The river provides an opportunity for comprehensive urban planning around a central axis, which extends “green fingers” and impacts on other parts of the city.

The fulfillment of this idea will bring about a significant change in the appearance and image of settlements. Sewage and nuisance arteries within the jurisdiction of settlements will be transformed into public parks and attractions for leisure activities. Open green areas, which will be developed in the riparian belt in an urban environment, will draw the open space into the midst of the city. They will connect between the multiple values of the open area – natural landscape, flowing water, flora and fauna – and will incorporate them into the urban area. Wise planning of a watercourse through a city will connect it to other regional sites – antiquities, natural sites and tourist attractions – drawing them all in and creating an affinity between them and the city. Thus, the river will help create a positive image of a settlement which faces the river and open spaces and is associated with the unique values embodied in these areas.

The rivers included in the urban fabrics identified in NOS 35 – consolidated urban fabric and disconnected urban fabric – are divided into two categories:

One. Rivers passing through an urban area, in an existing built environment: In this case, possibilities are relatively limited although different alternatives are possible, especially with regard to developing a central green axis along the watercourse. According to this conception, the river path and its environs will be designated as a linear urban park for leisure purposes in the urban environment and for the development of leisure and tourist-oriented projects. Special attention will be devoted to upgrading the interface between the built section and the “green space,” even if only minimal, around the river.

Two. Rivers passing through a consolidated or disconnected urban fabric, in areas which are not presently built up: In this case the possibilities are much wider, since the urban fabric is subject to future planning. NOS 35 establishes the watercourse and its banks as a central green axis, a linear open public area alongside new urban building areas. The local plan will give preference to leisure uses along the watercourse and riverbanks. It will also formulate provisions and guidelines on the design of the frontal building section – the first row of houses facing the river park – and on the relation between it and the green space. This will provide for an optimal “ending” to the building line which would entail enhancement of the link, view and space between the built area and the river park.

Attention will also focus on protecting the open routes, which are perpendicular to the river line and face it. The resulting structure will be an avenue, with the riverbed as its central watercourse, which extends “green fingers” into the built interior of the city. This structure will connect the city to the riparian park to assure open views and access routes to the river park from different vantage points in the urban area, in the form of streets which are perpendicular to the watercourse. Such a structure is vital for creating a clear pattern of city alignments and connecting them to a qualitative central focal point.

3.3 *Rivers in Open Spaces*

In open areas, master and outline plans for rivers will be prepared which emphasize and strengthen the uniqueness and importance of the river within the open space. Rivers transverse different landscape formations along their course and reflect the landscape diversity of the country. Hikers along the country's main watercourses will be exposed to landscapes characterized by high mountains, hills, cultivated plains, kurkar (carbonate-cemented quartz sandstone) ridges and sand dunes. One continuous path will unfold different appearances and images of the country. These will be augmented by other sites and entities along the river which connect wider spaces, each interesting in its own right, such as archaeological and historic sites, national parks, forests, natural groves, nature reserves, local attractions, entertainment and leisure sites, etc. In this way, different sites will be interconnected in a logical and continuous route and will converge into a hiking and observation route which displays the wealth of the country's landscapes and sites.

It is expected that river routes may become central axes in the system of culture, leisure and countryside excursions. Trails will be accompanied by data and instruction sheets which will describe the entire watercourse while relating to adjacent sites as well. In this way, public awareness of the social and cultural value of rivers will be increased as well.

Accentuating the watercourse within its environment has special landscape value. Rivers that pass through a mountainous environment are distinct and dominant. On the other hand, rivers along a plain area may become "lost" within the background of the cultivated areas around them. In both cases, and especially along the plain, rivers should be given special emphasis and prominence. This will largely be done by means of vegetation, which in the case of mountainous areas, will be natural, unique and distinct from the riparian environment, and on the plains, will consist of tall trees to accentuate the path of the river. The land designation of "riparian planting" in NOS 22 (the National Outline Scheme for Forests and Afforestation) may serve as a suitable framework for these planning and design requirements.

Landscape changes in the northern Negev, which were created by planting rows of forests along riverbeds are noteworthy in this regard. They have helped to create a new environment – both in terms of design and soil conservation.

The interface (or internal area) of the watercourse has its own importance: its elongated-axial form significantly increases its interface with its environment, in comparison to expanses which are not linear. This, in turn, increases the so-called landscape "product" – availability and access of recreation and leisure areas – and the importance of economic aspects of river development and rehabilitation.

Different plans will be prepared for rivers in different parts of the country, according to the special features, location and environmental and social requirements in each site. Differentiation between different rivers will be made on a number of levels:

River Character: A distinction will be made between perennial streams and dry streams. In perennial streams, efforts will focus on water recovery, even if only partial. Discharge of water which is of a reasonable quality will bring about different levels of ecosystem rehabilitation, habitat recovery, and restoration of natural species to the riverbed. A long-term goal may be to restore the water, fully or partially, to all rivers which were once characterized by a constant water flow which enhanced the natural landscape and image of the country.

Dry riverbeds will be rehabilitated in a different form, with an emphasis on floodwater regulation and local collection of water – or localized discharge – in sections of the river. This will be especially relevant for rivers flowing in arid areas, the Negev and the deserts of Samaria and Judea. In these areas, water reservoirs may be integrated with desert tourist development.

River rehabilitation plans should relate to the entire drainage basin and to its flow regime. Such plans should provide guidelines on land use distribution and water-conserving building methods throughout the entire drainage basin.

River Environment. A distinction will be made between sections of rivers flowing in a mountainous, hilly or flat landscape or in different types of agricultural landscapes. Reference will be made to contact with cultivated areas, passage through ravines, sand dunes, salinas, distinct river landscapes (such as exist in northern Israel) and river outlets to sea.

Geographical Region. River rehabilitation and development will be adapted to the character of the geographic area and to local ecological values – the relief, the land path, flora and fauna formations, traditional agriculture, and local materials – in order to sharpen the distinction between different regions of the country and to create a singular image for each river, which will be integrated in the landscape and will reflect it.

A comprehensive framework for river planning in Israel will distinguish between types and features of rivers and will define forms of enhancement, rehabilitation and image, which will faithfully reflect each of the groups: rivers of northern Israel which are characterized by an abundance of water, rivers of the Western Galilee, Carmel and Samaria which are integrated in natural groves, rivers of central Israel which function as buffer zones and focal points for leisure and recreation, and rivers of the Northern Negev and of the desert.

4. WATER ALLOCATION TO RIVERS

The allocation of natural resources, especially water, for agricultural, urban and industrial supply was self-understood in Israel for many years. This approach led to the destruction of the country's water landscapes and to severe damages to natural assets. The Midrashic literature ((Avot de-Rabbi Natan) states that "Water is called life." Today, it is clearly evident that uncontrolled water exploitation has precipitated the death of diverse and rich forms of life. It may be parenthetically mentioned in this context that the disastrous draining of the Hula Lake in the 1950s first raised public awareness of nature conservation, leading to the creation of the Society for the Protection of Nature in Israel. In 1963, the Water Commissioner was petitioned to ensure water to the country's landscapes. Consequently, the Water Commissioner approved water rights to the Hula Nature Reserve, the Keziv River (Ein Po'em), the Amud River, the Taninim River, the David River (Ein Gedi) and more.

In 1995, the Water Commission recognized Israel's rivers as a "legitimate consumer" of water in the framework of the national water economy, a decision which holds special importance for the rehabilitation of the rivers, the design of their visual and ecological character and the possibilities for their economic and landscape development.¹

Water discharge to the river is of primary importance since it reflects the essence of the river. Different benefits and functions may be differentiated in this regard, as follows:

Ecological aspects: Water presence is vital for the recovery of the part of the ecosystem which characterized rivers in the past. A unique and distinct ecosystem once existed in rivers, which developed as a result of water flow – either constant or seasonal. Each river had a characteristic ecosystem, related to the source of its water, its quality, chemical and physical conditions, salinity, oxygen, etc. Flora and fauna adapted themselves to this environment, in different sections of the river, and their distribution and adaptation were largely dependent on the consistency and quality of the water flow.

¹The Water Commission commissioned a study from the Israel River Rehabilitation Administration on "Water Allocation for Rehabilitation of Selected Rivers in Israel" in order to determine the water quantities needed to rehabilitate rivers from an ecological, landscape, leisure and recreation viewpoint. Most of the country's large rivers were included in the study, including many of the coastal rivers and the Zippori, Harod and Yavne'el rivers. An analysis of water allocations, based on the study by Dr. Eran Friedler and Dr. Marcelo Juanico (1996) is presented below. Two types of water investments were calculated, as follows:

1. **Gross allocation** – the quantity of water which must flow in the river. The natural flow of the river was reconstructed from an analysis of historic flows, based on hydrological annuals and reports dating back to the British Mandate, before man-made changes. In terms of ecology, two values are accepted – a minimal flow to maintain a healthy ecosystem is calculated at 30% of natural flow of the river. A minimal survival flow (for short periods) to assure that the ecosystem does not disappear is estimated at 10% of the base natural flow. Below this value, grave impacts on the ecosystem may occur.
2. **Net Allocation** – the gross allocation minus the water quantity which may be utilized downstream for different purposes (irrigation, infiltration, etc.). This is the actual water quantity that the water economy will allocate for the benefit of the rivers.
- 3.

Rehabilitation and landscape design: Flowing water will induce a substantial change in creating a new environment – a landscape formation based on a flowing river, with characteristic sounds and appearances – quays, boats, fishing, etc.

Leisure uses: Flowing water will enrich the leisure functions of the river, assist in developing the riverbanks as regional and urban parks and as recreation and entertainment centers – especially in proximity to urban centers.

Economic value: Rehabilitation of the river and discharge of water in its riverbed will raise land values near the river. Development initiatives for tourism and leisure will also enhance land value.

4.1 *Impoundment of Floodwaters*

River flooding can destroy built and agricultural areas, especially downstream. There is significant advantage to moderating the force of floods, by blocking the waters upstream and collecting them in large reservoirs. This is valuable both in terms of efficient utilization of water (instead of wasteful discharge to sea) and reduction of flood risks downstream. It will also have environmental-tourism value if reservoirs are established and operated in combination with landscape planning and tourism. In some cases, it may be possible to utilize some of the collected floodwater as an additional source of water to the river.

A balance should be struck between “catching” the floodwaters and collecting them upstream – to help moderate floods – and maintaining the function of flood events – as part of the natural hydrological regime of the river and of the ecological function of floods in cleaning the riverbed and removing sediments which have accumulated along its course.

In this regard, the floodplain of the river, located on level ground alongside the riverbed, plays an important function. Potential floodplains should be identified, defined, and incorporated into the rehabilitation plan of the river downstream. They will be designated as green leisure areas, free of building and development, thus enabling the use of open space to be integrated with the hydrological function of the floodplain – the absorption of water during flooding events and prevention of damage downstream.

4.2 *Discharge of Effluents to Rivers*

Discharge of effluents to rivers is currently perceived as a practical solution to the problem of water supply. It will allow for the recovery of flow systems and provide a solution to effluent surpluses near population centers. Minimal effluent quality must allow for recreation without direct contact, in accordance with accepted standards. At the same time, determination of treatment levels must take into account economic and ecological considerations, definition of objectives and types of uses and designations along the watercourse.

5. EXPRESSION IN NOS 35: MAPS AND PROVISIONS

NOS 35 presents the national river system in its scale maps and relates to watercourses as designated land uses (see Fig. 2). The map displays those rivers whose impression is distinct and discernible from a landscape and environmental point of view. It does not relate to the entire river system in Israel and therefore some small drainage basins are not represented. This, however, is not meant to minimize their importance, and local plans may be prepared for rivers which are not included in the map.

Preparation of River Plans

1st. Requirement to prepare a master and outline plan for the river and its tributaries:

Such a requirement creates a framework for river rehabilitation plans, which were first initiated in recent years by the Israel River Rehabilitation Administration and river authorities. The watercourses which appear on the map will serve as a basis for river master and outline plans. Partial plans may be prepared for river sections which are of special importance, or a number of watercourses may be united in a regional plan. In all events, the form of the plans will be guided by the above-noted map.

2nd. Limitations: Development limitations, as stated in the plan provisions, will be in force in the riparian belt area and its realm of impact, until such time that an outline plan for the river is prepared. When the outline plan will come into effect, its new borders and detailed provisions will apply.

6. FRAMEWORKS OF OUTLINE PLANNING

NOS 35 calls for the preparation of a series of master and outline plans for rivers. The preparation of so many outline plans, which include Israel's major rivers, must be "sequential," – free of unnecessary bureaucratic delays. An appropriate platform, both planning and spatial, should be created to determine plan boundaries in order to prevent the loss of time and resources in preparing frameworks rather than undertaking actual planning.

Plans which are derived from NOS 35 will deal with two central issues: the planning authority and the area of planning. Within this framework, the creation of a **stable planning base** for

river plans should be considered, which will be composed of a **river authority, which unites different disciplines, and relates to one planning area - the drainage basin of the river.** Such an organizational structure is essential for the sequential preparation of river plans.² At the same time, each region should be allowed to coordinate and concentrate the plans according to its unique administrative and physical conditions.

7. RIVER PLANNING PRINCIPLES ON THE NATIONAL LEVEL

- 1st.Regulation of water flow:** The river, by its very being, is designated to concentrate surface runoff in a drainage basin. Therefore, the river plan must, first and foremost, focus on regulating flow – flood prevention, floodplain preservation, and comprehensive and regular drainage of the basin.
- 2nd.Preservation of a green watercourse toward which open spaces converge:** The river serves as a central strip, toward which open spaces converge, through river tributaries, roads and trails, signs, and general orientation. Open spaces are vital in terms of their ecological importance and as values in their own right in national spatial planning.
- 3rd.Development of leisure, tourism and recreation uses:** One of the central functions of a watercourse is for leisure and countryside recreation in a linear park, which utilizes facilities and attractions which will be established alongside the river.
- 4th.Continuity principle:** As in the case of the shoreline, the continuity principle which assures the public's right to free movement along the watercourse, both in open and urban environments (but with the exclusion of defense and safety restrictions), will be upheld. This principle will guide river master and outline plans in establishing a system of riparian paths which will preserve continuity (with possible passageways between the two banks) – with first preference to pedestrians and cyclists.
- 5th.Preservation of a natural path:** The natural path of the river has special landscape and ecological value, and outline plans should strive to preserve it while preventing the straightening and shortening of meanders (as far as possible). Riverbanks too should be preserved in their natural state as far as possible – except for certain points which are vital for diversion, regulation and stabilization, within the provisions of the Drainage Law, as will be established by the Drainage Authority with the agreement of the District Planning Commission.
- 6th.Rehabilitation by natural means:** River rehabilitation will be implemented, as far as possible, by natural means, utilizing local materials and accentuating the features and components of the river's environment. As far as possible, use of foreign elements (such as concrete in the riverbed) should be prevented and bank regulation should be undertaken in a wide gradient and with “green” technology, such as stabilization by means of vegetation.

² The English Water Act of 1973 divided the country into 10 large regions, based on the major drainage basins. For each region, a Regional Water Authority was established with comprehensive responsibility for all water issues in its jurisdiction. These water regions deviated from municipal and administrative boundaries and conformed to the natural boundaries of landscape units and drainage basins – an advantage that absolves the system from administrative constraints which are unconnected to professional aspects. (See, in detail, *Water Systems Management in Israel – The Legal Framework*, M. Dennis Gouldman, The Floresheimer Institute for Policy Studies Ltd.).

7th.Relation to the landscape unit: The river rehabilitation plan should be guided by the landscape and environmental features of the area through which the river passes. To create a distinctive identity and image and to adapt the river to its natural environment, vegetation and materials which will reflect the “spirit of the place” should be used.

8th.Restoration of water to the river: Efforts should be made to restore a constant water flow to perennial rivers, where a stable water flow once existed, especially to the coastal rivers. A mechanism is required for administering water discharge to the river at a quality, quantity, location and season which are most suitable for river rehabilitation and revitalization. In many cases, recovered water may be utilized for this purpose. Water recovery will be based on a permanent allocation, while creating the necessary physical and economic conditions. Awareness must be heightened of the fact that the river is a legitimate water consumer, equal in value and importance to public gardens, pools and ponds in public parks, etc. Restoration of water to the coastal rivers will change the landscape and image of large sections of the country, in general, and the center, in particular.

9th.Limitations: In the watercourse area and the realm of impact of the river, as will be defined in detailed outline plans, preference will be given to land uses which are linked to the physical, ecological and social functions of the river. These may include regulation of flow, drainage, pumping, green development, restoration of habitats, plantings, maintenance, and leisure and recreation uses. Any use, which is not intrinsically vital to the river, will be moved to farther areas. This principle will be expressed in the provisions of the outline plans. It is formulated in the spirit of a similar principle in NOS 13 (National Outline Scheme for Coasts) which relates to land-use designations on the seashore.

10th.Definition of Realm of Impact: The criteria for determining the realm of impact will be: width of river required to allow for the free passage of flood flow; preservation of floodplains; identification of areas with natural and landscape values which have an affinity to the river and its banks; definition of a safety belt on both sides of the river for roads and maintenance facilities; accessibility to the river; and assurance of sufficient areas on the riverbanks for prevention of erosion processes.

11th.Cultural and Tourist Importance: Some of the country’s rivers have world importance. They are cited in the Bible, their names are associated with historic events, and they represent landmarks in world history and human consciousness. Such rivers include the Jordan, the Elah Valley, the Kishon, the Soreq, the Gerar, the Kidron, the Ayalon Valley and others. All these bear the historic and national memory of the people and are of utmost importance from an educational and cultural viewpoint. These rivers should be incorporated in the national tourism system and deserve to be accentuated, documented and marked as essential elements in the heritage of the land.

8. SUMMARY

The goal of river rehabilitation and restoration of the river's environmental and value functions is achievable today. A combination of factors, including an increase in public awareness of environmental and ecological issues, recognition of the gravity of the problem and the need for a change, growing importance of green and accessible areas for the benefit of the population – all these provide the necessary background and basis for the proposed planning framework.

NOS 35 accords an important function to coastal rivers and to the agricultural regions which surround them, as buffer zones, which separate urban systems, and as green lungs – potential areas for leisure activities for the benefit of the population of the central region of the country.

According to this conception, rivers are important components of the spatial-physical structure of national planning, and they aid in creating a logical structure and in demarcating the boundaries of building and development.

The claim that the crux of the problem lies with pollution sources and that rehabilitation cannot proceed before pollution problems are solved will only obstruct the rehabilitation process. While waiting for the removal of pollution sources will only delay the process, initiation of development work – parallel to regulating, treating and utilizing effluent discharge and enforcing relevant laws and regulations – will help raise public awareness of the need for nuisance prevention. Discharge of sewage into a riverbed with environmental and landscape value will increase public response and pressure (as was the case in the Yarkon River), while continuation of sewage discharge into a “neutral” course, will not elicit a public outcry. In other words, the very act of planning, rehabilitating and developing the river – even in its damaged state and in parallel to rehabilitation efforts – will play an important role in nuisance prevention and in treatment and rehabilitation processes.

The rehabilitation and treatment of rivers and their inclusion in the framework of environmental, spatial and cultural functions is possible today. The appropriate framework is national and comprehensive. Planning guidelines, on the national outline level, are expressed in the documents of NOS 35, its maps and provisions and in the development plan. The plan calls for the preparation of local outline plans and local rehabilitation and development plans. Creative thought, good will, and readiness for cooperation among all relevant authorities and factors will result in the achievement of the objectives.

9. PROPOSED PROVISIONS FOR NOS 35

Presented to the Planning Administration, Ministry of the Interior – May 1999 Riparian belt (marked on the map by a continuous blue stripe)

For riparian belts marked in the fabric map, the District Commission, in cooperation with the Ministry of the Environment, will initiate a partial district or local outline plan, which will relate to the river and its environment. **The section of the river for planning will not be less than 5 km or, alternatively, will be limited by the boundaries of the fabric.** The outline plan for a river will be presented to a planning agency within five years of its approval in order to allow for approval no later than 1.1.2010.

The outline plan for rivers will consider the entire gamut of considerations relevant to the river and its environment, and especially rehabilitation of the river and its **natural habitats**, based on its features, flow and drainage regime, safeguards and restrictions with respect to pollution nuisances, floods, bank erosion, etc. The plans will set preferences for land uses with direct affinity to the river, its vicinity and its value and will limit uses and nuisances which have no affinity to the watercourse. The plans will emphasize natural, heritage and landscape values, preservation of the natural features of the river and its adjoining landscape, design principles which relate to the visual basin of the river and recreation and leisure uses including the right of the public to reach the river and to freely move along its entire length.

Among others, the plan will determine the width of the riparian belt and the width of the realm of impact, according to environmental conditions and the path of the river.

Until such time that the outline plan will be **approved**:

- 1st. Development activity will not be permitted in the riparian belt area and at a width of 100 meters from each bank in unbuilt areas, with the exception of infrastructures which will be designated subject to the preparation of an environmental-landscape document, which will relate to the features of the river, the flow and drainage regime, safeguards and restrictions from pollution nuisances, floods, bank erosion, **landscape and ecological rehabilitation**, etc. as these are relevant to the proposed infrastructure. **In any case, development and building objectives with no affinity to the river will be restricted. Activities on behalf of river rehabilitation, drainage regulation, landscape and ecological rehabilitation, plantings and leisure facilities will be permitted.**
- 2nd. Expansion plans for the built area at a realm of 500 m from each riverbank will be contingent on the preparation of an environmental-landscape appendix, which will relate to the subjects detailed above. **Development will be directed to an area which is further removed from the river.**
- C. Within built areas, **which exist at the time of plan approval**, in consolidated and unconnected urban fabrics, development activities will be permitted, with special reference to proper design and treatment of the interface between the built area and the riparian belt.