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United Nations Development Programme  
Country: Republic of Armenia  
Project Document

Project Title: Lake Sevan Coastal Zone Cleaning

UNDAF Outcome: 4 Environment and disaster risk reduction is integrated into national and local development frameworks

Expected CP Outcome: 4.1 Armenia is better able to address key environmental challenges including climate change and natural resource management

Expected CP Output: 4.1.1 National policies and tools for implementation of and compliance with international environmental agreements are developed and adopted

Implementing Partner: Ministry of Nature Protection of RA

**Brief Description**

Considering the importance of Lake Sevan in the social and economic development of the country, the Government of Armenia took and continues to take a number of measures to preserve ecosystems of Lake Sevan and its water collection pond, restore ecological balance of the lake and ensure proper and balanced development of biodiversity and sustainable use of natural resources. Although a number of measures in 2003-2010 were implemented to increase the level of the lake creating good conditions for the restoration of water ecosystem and biodiversity, an increase of water has negatively impacted surrounding forest areas – around 4000 ha were swamped by upraising water level.

The overall objective of this project is to support the Government of Armenia in protection and rehabilitation of Lake Sevan ecosystem.

The Project specific objective is to support with cleaning of lake's covered 170 ha forest and surrounding swamp areas of to prevent further eutrophication processes and ensure relevant quality of the water in the Lake.

Programme Period:	2012-2013	AWP budget:	\$ 361,556.00
Atlas Award/Project ID:	00067592/00083279	Total resources required:	_____
Start date:	01.07.2012	Total allocated resources:	
End Date:	15.04.2013	• Regular	\$ 60,259.00
LPAC Meeting Date:	12.06.2012	• Other	
		Government	\$ 301,297.00*
		Unfunded budget	
		In-kind contribution	_____

*\*Funds will be received in AMD and converted to USD at the rate of exchange on the date of contribution.*

Agreed by the Government:  
Name: Aram Harutyunyan  
Title: Minister of Nature Protection



signature

24.07.12  
date

Agreed by UNDP:  
Name: Dafina Gercheva  
Title: UNDP Resident Representative

signature

24.07.12  
date

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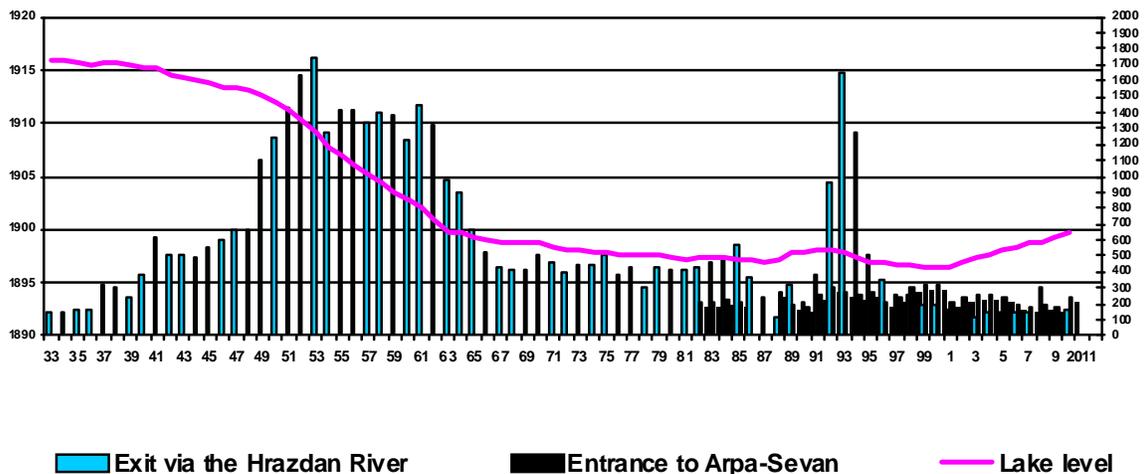
## I. SITUATION ANALYSIS

Lake Sevan is located in the Gegharkunik region, central part of the Republic of Armenia about 1900 m above sea level. As a part of Armenia's water ecosystems, Lake Sevan is of utmost importance with its water collection pond, preservation, sustainable use and management. Lake Sevan is the largest alpine freshwater lake in the South Caucasus. The total area of the lake's basin is about 5,000 sq km, of which 1,250 sq km constitute the lake surface, and the lake volume is 38.5 billion cu m. Lake Sevan is included into Sevan national park area with the territory of 150,100 ha. Twenty-nine rivers flow into the lake from its watershed. The Hrazdan River is the only outlet from the lake.

Well-known for its unique fish species, Lake Sevan stands among the most threatened ecosystems in Armenia. In recent past, the lake had 3 endemic fish species, namely Sevan trout with its 4 subspecies, Sevan whitefish and Sevan barbel. Lowered level (by some 20,2 meters) of Lake Sevan resulting from considerable water outlet for economy and energy development purposes along with inefficient use of water resources, industrial overuse of various fish species as well as increased current waters flooded with lots of biogenic matters, heavy metals and pesticides flowing into the lake as a result of developing economy in the water collection basin area led to large-scale changes in Lake Sevan and brought about radical restructuring of the lake ecosystem and its biodiversity.

As it is stated above, a decrease of almost 20 meters compared to the lake's level of 1915.9 meters has occurred due to the excessive water use for energy generation and agriculture activities. The present level of the lake is 1897.45 m. The volume of water has been reduced from 58.5 billion cu m to 33.0 billion cu m, and the lake's surface area has been reduced from 1416.2 sq km to 1228.1 sq kilometers. During intense water releases (1949-1962) it amounted to 13 meters (1 meter/year).

The figure below illustrates the volumes of water releases from the lake and annual level fluctuations starting from 1933 to 2011.



Environmentally such a dramatic rate has played a key role in destabilizing lake's hydrological criteria and processes below. A reduction of existence period of thermal stratification of the lake occurred by a 50% decrease (from 13 km to 6 km) of hypolimnium in Small Sevan, and its elimination in Big Sevan. The reduction of hypolimnium resulted in a number of consequences: lake's average annual temperature has risen by 2oC, the duration and intensity of horizontal and vertical streams, which caused a several time increase in the concentration of suspended and dissolved organic substances in the medium and top layers of the water. The oxidation of organic substances has led to a decrease of the oxygen concentration in the lake (from 8.0 mg to 3.0 mg O<sub>2</sub>/l). The concentration of mineral and total forms of nitrogen in the lake has increased by 30

times (from 0.01 to 0.32 g/cu m), and the concentration of phosphorus has decreased by 20 times (from 0.32 to 0.017 g/cu m). This caused the intensification of nitrogen and phosphorus absorption by algae and stimulated the growth of algae. The lake's photo-transparency, which plays a determining role for the normal course of physicochemical and biological processes, has decreased by four times (from 13.0 to 3.0 m).

Some very deep and sometimes irreversible processes have taken place due to these changes. A rapid decrease in biomass of high-grade water plants (macrophytes) (from 9000000 t to 8000 t) has happened. The macrophytes absorb nitrogen, compete with algae (phytoplankton), and prevent their reproduction. Thanks to the above changes in the lake, its ecosystem was completely changed, and starting from mid-1970s the lake started to bloom with green-and-blue algae, which all led to lake's eutrophication.

The increased inflow of nutrients is the second in turn, and evens the first in significance prerequisite for the environmental changes. The lake is currently in mesotrophic state being very close to the eutrophic one. The study of the eutrophic mechanism has shown that in order to stop it there is a need in such a regulation of the "lake-catchment area" ecosystem that will result in the limitation of biogenic elements and organic substances load in the lake originating from bottom sedimentation.

The use of dependence of the accumulation of organic substances upon the lake's average depth, rehabilitation conditions of hypolimnium, and a number of other regularities supported to prove that the following is needed for the lake's de-eutrophication: (i) raise the lake's level by 6 meters; (ii) revise and environmentally regulate the entire socio-economic activity in the watershed basin since water pollution of the lake is another quite serious problem.

Almost no biological wastewater treatment plant is fully operational within the Lake Sevan catchment area.

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## **II. ACTIONS TOWARD ADDRESSING LAKE SEVAN PROBLEM**

In order to raise the level of the lake using the river flow in neighboring watersheds, and limiting outflow should replenish its water resources.

For that purpose in 1962, a large complex construction was initiated to divert the Arpa River's flow to the lake. It was designed to supply some 250 million cu m/year of water to the lake. The Arpa-Sevan tunnel was put in commission in 1981.

Thermal power plants were built to replace the Sevan-Hrazdan cascade's power supply. Part of the irrigation outflow was replaced with the waters available in the Ararat Valley's lowland. These actions gave an opportunity to significantly slow down the drop in the lake's level starting from 1965, when the outflow was limited to 500 million cu m, of which 380 million cu m for irrigation purposes, and the 120 million cu m for power generation purposes. The latter was stopped in 1978.

After these actions, the lake's level rose by 0.9 meters in 1981-1990, and dropped by 1.5 m in 1991-2000 due to intense water releases during the energy crisis.

The Lake Sevan Ecological Balance Rehabilitation Project has been initiated and drafted with the financial support of the World Bank in 1996-1998. The Project mainly covered the following issues:

legislation, management issues, raising lake's level, wastewater treatment in the catchment area, domestic and industrial waste management, non-point pollution prevention, fisheries conservation and rehabilitation, biodiversity protection.

Given the great significance of Lake Sevan and its role for the country, the National Assembly passed in 2001 the Republic of Armenia Law "On Lake Sevan". The law defines Lake Sevan as a strategic freshwater object of environmental, economic, social, scientific, historical and cultural, aesthetic, health, climatic, recreational, and spiritual value. The RoA Law "Annual and Integrated Programs for Lake Sevan Ecosystem Rehabilitation, Protection, Reproduction, and Use" has been drafted and adopted.

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### **III. PROBLEM STATEMENT**

Considering the importance of Lake Sevan in the social and economic development of the country, the Government of Armenia took and continues to take a number of measures to preserve ecosystems of Lake Sevan and its water collection pond, restore ecological balance of the lake and ensure proper and balanced development of biodiversity and sustainable use of natural resources. After the Arpa-Sevan tunnel, the Vorotan-Sevan tunnel was constructed and put in commission in the end of 2004 to replenish water resources of the lake. These actions will give a possibility to additionally supply 165 million cu m of water/year to the lake. To raise the level of Lake Sevan, quotas are established for the annual volume of water channeled for irrigation and energy-making purposes through the irrigation waterline of Hrazdan (approximately 80-150 mln m<sup>3</sup> during irrigation period only).

Thus, following a number of measures in 2003-2010, the level of the lake rose by 247 cm creating good conditions for the restoration of water ecosystem and biodiversity. As of 2011, the absolute value of the Lake Sevan has reached 1900.28 m. However, increase of water has negatively impacted surrounding forest areas – around 4000 ha were swamped by upraising water level. Meantime, the negative impact of submerged coastal forest plantations on the quality and pureness of water in the lake due to decomposition is evident. Considering the fact, the RA Government funded and took actions to clean forest plantations.

In addition, the development of RoA Governmental draft Decree on Approving New Forest Floor around Lake Sevan Program is in progress. The Program covers the following actions: identify and map prospective areas in terms of afforestation within Sevan National Park and its neighboring communities, identify types and volumes of seedlings needed, as well as activities to identify financial, human and technical resources.

As part of water cleaning programme, the Ministry of Nature Protection has conducted several cleanup campaigns in different areas of the lake Sevan National Park funded under Medium Term Expenditure Program (MTEP). Between 2005-2011 periods of time, an area of forest residues covering 1400 ha was cleaned. It is also expected to clean up around 2600 ha during next ten years in case dynamic of water level increase will follow predictions. Within the frame of planned activities it is envisaged to clean 170 ha in 2012-2013.

Considering experience of previous years, taking into account capacities and experience of UNDP CO in executing large –scale infrastructure projects, considering possible co-funding modalities to cover gap in national funding to fulfill the task, the Government of Armenia has requested UNDP contribution and support in implementing Lake Sevan Coastal Zone cleaning activities in 2012-2013.

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### **IV. PROJECT OBJECTIVES AND OUTPUTS**

The overall objective of this project is to support the Government of Armenia in protection and rehabilitation of Lake Sevan ecosystem. The Project specific objective is to support with cleaning of lake's covered 170 ha forest and surrounding swamp areas of to prevent further eutrophication processes and ensure relevant quality of the water in the Lake.

The project will consist of the following three stages:

- International procurement of civil works and services and independent technical assessment and certification of bill of quantities;
- Cleaning activities as per technical specification provided in the Annex 1 to the Project document in the four districts of the Lake Sevan National Park namely Martuni, Noratus, Vardenis and Vardenik
- Provision of a supervision and independent technical control

It is expected that at the end of the project the following specific results will be achieved:

- 170 ha of forest and swamp area of the Lake Sevan National Park will be cleaned from stamp, roots, leaves, rags, etc.
- Timber (quantity identified in technical proposal –Annex 1) will be removed and further utilized in the result of cleaning

This project falls under the Environmental Governance Portfolio of the 2010-2015 Country Program Action Plan (CPAP) signed between the Government of the Republic of Armenia and UNDP Country office.

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## **V. MANAGEMENT ARRANGEMENTS**

A Project Committee (PC) will be established to provide oversight over the implementation of the project, comprising the representatives of UNDP, Ministry of Nature Protection and its subordinated agencies (“Lake Sevan National Park” SNCO, “Environment Project Implementation Office” SNCO), the Committee on Lake Sevan Issues adjacent to the President of the Republic of Armenia, organisation providing technical control and Gegharkunik regional administration.

Members of the PC will be appointed by each institution and announced during the Project Appraisal Committee (PAC) meeting, where draft project document and annual work plan (AWP) will be appraised and endorsed. PC decisions should be made in accordance with standards that shall ensure management for development results, best value money, fairness, integrity and transparency. In addition, the PC will play critical role in project evaluations by quality assuring the evaluation process and products, and using evaluations for performance improvement, accountability and learning.

The Ministry of Nature Protection, as a government designated authority responsible for Protected Area management, will serve as a National Implementing Partner for the project and will ensure consistency of the project outcomes with national policies. The Ministry will appoint the Project Responsible Person who will in daily contact with UNDP CO and assume the overall responsibilities for project implementation on behalf of the Ministry.

UNDP Armenia will provide support services to the Implementing Partner. In particular, UNDP will conduct procurement of works and services in line with UNDP corporate rules and procedures. Signing and managing contracts on civil works for cleaning, as well as signing and managing professional services contracts (such as independent certifying expert, as well as technical control service) for supervision and monitoring of works will be also part of responsibilities.

UNDP will hire on competitive basis a short term international engineer to conduct certification of quantities and value the project design, as well as will hire professional service for technical control. Procurement of works and services will be conducted through ITB (Invitation to Bid) modality following UNDP’s corporate procurement rules and regulations, and through the use of Ministry’s technical specification for tasks to be conducted. Representative of the Ministry of nature protection will be involved into Evaluation panel assessing the procurement results.

Completed works will be evaluated by PC. To ensure transparency of the process, it is suggested that the Act of acceptance will be signed between sub-contractor, the Ministry of Nature Protection as a final beneficiary, UNDP and organisation for technical control.

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**VI. RESOURCES**

The Ministry of Nature Protection of Armenia has applied to the State Budget for receiving respective funds to fulfil the objectives of cleaning project as in previous years. 125,4 million AMD were allocated by state budget for Lake Sevan cleaning activities. In addition to the financial contribution, the Ministry will also provide single special-purpose machinery (Water master) to enable cleaning activities in the water. Conditions for the provision of the equipment are the subject of separate agreement between the Ministry of Nature Protection and contractor organisation to be hired by UNDP.

It is expected that UNDP country office in Armenia will add additional 25 million AMD from its regular sources to accomplish the task. The total funds will be managed by UNDP in accordance with UNDP rules and procedures and, therefore, are included in the total project budget stands for 150,4 million AMD (see description in annual work plan budget matrix).

A tentative mechanism and schedule of payments is spelled out in the Cost-Sharing Agreement between the Government of Armenia and UNDP signed on June 13, 2012. Above mentioned schedule may be subject to amendments on the basis of the payment schedule to be received by the civil works contractor upon completion of the Invitation to Bid process.

**VII. ANNUAL WORK PLAN AND BUDGET**

EXPECTED OUTPUTS <i>And baseline, associated indicators and annual targets</i>	PLANNED ACTIVITIES <i>List activity results and associated actions</i>	TIMEFRAME 2012-2013				RESPON-SIBLE PARTY	Funding Source	Budget Description	BUDGET 2012	BUDGET 2013
		Q3	Q4	Q1	Q2				Amount**	
<p>Output 1: National policies and tools for implementation of and compliance with international environmental agreements are developed an adopted</p> <p><i>Baseline:</i> Considering the importance of Lake Sevan in the social and economic development of the country, the Government of Armenia took and continues to take a number of measures to preserve ecosystems of Lake Sevan and its water collection pond, restore ecological balance of the lake and ensure proper and balanced development of biodiversity and sustainable use of natural resources. Although a number of measures in 2003-2010 were implemented to increase the level of the lake creating good conditions for the restoration of water ecosystem and biodiversity, an increase of water has negatively impacted surrounding forest areas – around 4000 ha were swamped by upraising water level.</p> <p><i>Indicator 1:</i> Quality and pureness of water in the lake Sevan improved due to removal of organic matter</p> <p><i>Target:</i> 170 ha of forest and swamp area of the Lake Sevan National Park is cleaned</p> <p><i>Related CP outcome:</i> Armenia is better able to address key environmental challenges including climate change and natural resource management</p>	<p>Activity 1: <i>Lake Sevan Coastal Zone Cleaning</i></p> <ul style="list-style-type: none"> <li>- International procurement of civil works and services and independent technical assessment and certification of bill of quantities;</li> <li>- Cleaning activities as per technical specification provided in the Annex 1 to the Project document in the four districts of the Lake Sevan National Park namely Martuni, Noratus, Vardenis and Vardenik;</li> <li>- Provision of a supervision and independent technical control;</li> <li>- Monitoring and reporting.</li> </ul>	X	X	X	X	MNP	Government	72100 - Contractual Services - Companies	\$ 207,398.00	\$ 85,123.00
								75100 - Facilities and Administration	\$ 6,222.00	\$ 2,554.00
								<b>Government Subtotal:</b>	<b>\$ 213,620.00</b>	<b>\$ 87,677.00</b>
								UNDP		
								72100 - Contractual Services - Companies		\$ 52,559.00
								71200 - International consultant	\$ 5,000.00	
								74100 - Professional services		\$ 1,700
								73500 – Reimbursement Costs	\$ 700.00	\$ 300
<b>UNDP Subtotal</b>	<b>\$ 5,700.00</b>	<b>\$ 54,559.00</b>								
<b>Grand Total for the Activity:</b>									<b>\$ 219,320.00</b>	<b>\$ 142,236.00</b>

\*\* Calculation done based on the official UN Currency Exchange Rate for July 1USD = 416.2 AMD

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**VIII. MONITORING FRAMEWORK**

The Project Committee (PC) during its meetings will evaluate the project implementation and sign the appropriate Minutes of the Meeting. In accordance with the UNDP programming policies and procedures, the project will be monitored through the following:

- Annual Progress Report in a standard UNDP format shall be prepared by the UNDP Project Responsible Person. Based on the above report, an annual project review may be conducted in the end of the fourth quarter of the year or soon after at the Annual Outcome Board Meeting to assess the performance of the project and appraise the Annual Work Plan (AWP) for the following year.

- A final assessment review will be conducted upon completion of the task. This review is driven by the Project Committee and may involve other stakeholders as required. It shall focus on the extent to which progress is being made towards outputs, and that these remain aligned to appropriate outcomes.

In parallel, an Issue Log shall be activated in ATLAS<sup>1</sup> and updated by the Project Responsible Person to facilitate tracking and resolution of potential problems or requests for change. Based on the initial risk analysis submitted, a risk log shall be activated in ATLAS and regularly updated by reviewing the external environment that may affect the project implementation. A Monitoring Schedule Plan shall be activated in ATLAS and updated to track key management actions. Monthly joint monitoring visits will be conducted along implementation of project activities and relevant monitoring records ensured.

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<sup>1</sup> Atlas is a UNDP run enterprise resource planning system and a project management module which supports to integrate results-based management methods, to allow for quality tracking and monitoring of projects, linking resources to results, facilitate reporting and monitoring, permit the user to interface for budget revisions, ensure electronic payments, etc. ATLAS environment also allows the users to maintain quality assessment, risk logs for effective project implementation.

## Technical Specification – the scope of cleaning activities of Lake Sevan Coastal Zone area

N	Title of works and services	Unit of measure	Volume	Total
<b>Martuni branch</b>				
1	Uprooting submerged (more than 1 meter depth) shrubs and certain trees by tractor WATERMASTER CLASSIC III	ha	12.5	
		ha	330* (495)**	
	Loading on the ПТС-М or similar self-propelled raft, shipping and unloading on the coast shrubs, certain trees and roots, along with rotten, putrid mass	m3	495	
	Partition of timber	m3	110	
	Loading of wood, brushwood and roots, along with rotten, putrid mass on a truck by CAT 428E or similar excavator	m3	495	
	Transportation on average distance of 10 km	m3	495	
	<b>Total</b>			<b>12.5</b>
2	Uprooting and pushing on to the truck loading place (average distance 200 meters) waterlogged and submerged (the depth up to 1 meter) shrubs and certain trees along with roots and rotten, putrid clod by T-170 or similar marsh tractor	ha	15	
		m3	450* (900)**	
	Partition of timber	m3	100	
	Loading bush and tree roots, along with rotten, putrid mass on a truck by CAT 428E excavator	m3	900	
	Transportation on average distance of 10 km	m3	900	
<b>Total</b>			<b>15</b>	
3	Uprooting and pushing on to the truck loading place (average distance 200 meters) waterlogged and submerged (the depth up to 1 meter) trees and shrubs along with roots and rotten, putrid clod by marsh tractor (T-170 or similar)	ha	11.7	
		m3	370* (740)**	
	Partition of timber	m3	280	
	Loading bush and tree roots, along with rotten, putrid mass on a truck by CAT 428E or similar excavator	m3	740	
	Transportation on average distance of 10 km	m3	740	
<b>Total</b>			<b>11.7</b>	
4	Uprooting submerged (more than 1 meter depth) trees and shrubs by WATERMASTER CLASSIC III tractor	ha	5	
		m3	175* (262)**	
	Loading on the ПТС-М or similar self-propelled raft, shipping and unloading on the coast tree and shrub roots, along with rotten, putrid mass	m3	262	
	Partition of timber	m3	120	
	Loading wood, brushwood and roots, along with rotten, putrid mass on a truck by CAT 428E or similar excavator	m3	262	
	Transportation on average distance of 10 km	m3	262	
<b>Total</b>			<b>5</b>	
<b>Total in Martuni branch</b>			<b>44.2</b>	

N	Title of works and services	Unit of measure	Volume	Total
<b>Noratus branch</b>				
1	Uprooting submerged (more than 1 meter depth) shrubs and certain trees by tractor WATERMASTER CLASSIC III	ha	8	
		m3	240* (360)**	
	Loading on the ПТС-М or similar self-propelled raft, shipping and unloading on the coast shrubs, certain trees and roots, along with rotten, putrid mass	m3	360	
	Partition of timber	m3	100	
	Loading of wood, brushwood and roots, along with rotten, putrid mass on a truck by CAT 428E or similar excavator	m3	360	
	Transportation on average distance of 10 km	m3	360	
<b>Total</b>			<b>8</b>	
2	Uprooting and pushing on to the truck loading place (average distance 200 meters) waterlogged and submerged (the depth up to 1 meter) shrubs and certain trees along with roots and rotten, putrid clod by marsh tractor (T-170 or similar)T	ha	3.5	
		m3	110* (220)**	
	Partition of timber	m3	60	
	Loading bush and tree roots, along with rotten, putrid mass on a truck by CAT 428E or similar excavator	m3	220	
	Transportation on average distance of 10 km	m3	220	
<b>Total</b>			<b>3.5</b>	
3	Uprooting and pushing on to the truck loading place (average distance 200 meters) waterlogged and submerged (the depth up to 1 meter) trees and shrubs along with roots and rotten, putrid clod by marsh tractor (T-170 or similar)	ha	3	
		m3	120* (240)**	
	Partition of timber	m3	40	
	Loading bush and tree roots, along with rotten, putrid mass on a truck by CAT 428E or similar excavator	m3	240	
	Transportation on average distance of 10 km	m3	240	
<b>Total</b>			<b>3</b>	
4	Uprooting submerged (more than 1 meter depth) trees and shrubs by WATERMASTER CLASSIC III tractor	ha	3	
		m3	100* (150)**	
	Loading on the ПТС-М self-propelled raft, shipping and unloading on the coast tree and shrub roots, along with rotten, putrid mass	m3	150	
	Partition of timber	m3	50	
	Loading wood, brushwood and roots, along with rotten, putrid mass on a truck by CAT 428E or similar excavator	m3	150	
	Transportation on average distance of 10 km	m3	150	
<b>Total</b>			<b>3</b>	
<b>Total in Noratus branch</b>			<b>17.5</b>	

N	Title of works and services	Unit of measure	Volume	Total
<b>Vardenik branch</b>				
1	Uprooting submerged (more than 1 meter depth) shrubs and certain trees by tractor WATERMASTER CLASSIC III	ha	17.1	
		m3	500* (750)**	
	Loading on the ПТС-М or similar self-propelled raft, shipping and unloading on the coast shrubs, certain trees and roots, along with rotten, putrid mass	m3	750	
	Partition of timber	m3	100	
	Loading of wood, brushwood and roots, along with rotten, putrid mass on a truck by CAT 428E or similar excavator	m3	750	
Transportation on average distance of 10 km	m3	750		

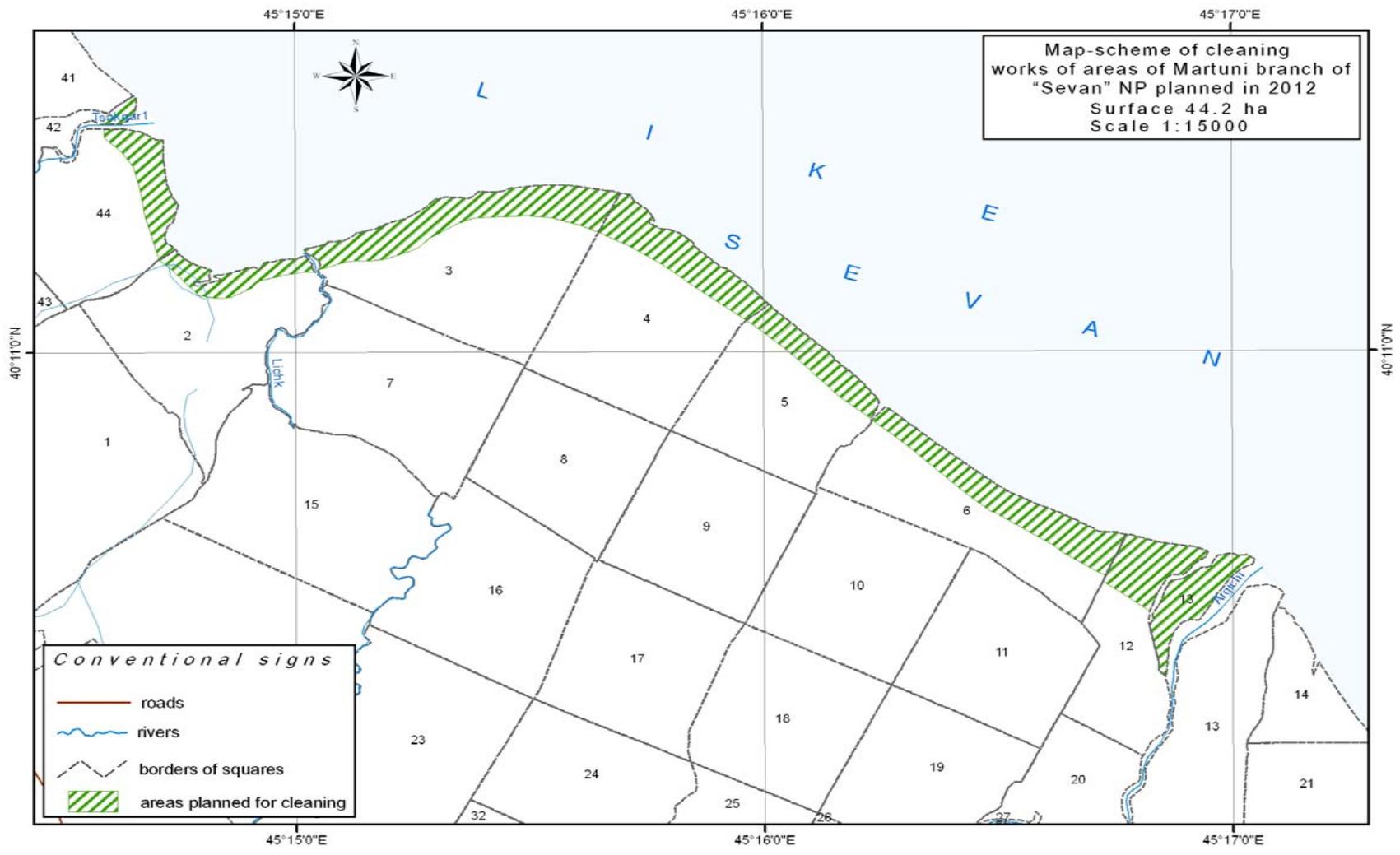
	<b>Total</b>		<b>17.1</b>	
2	Uprooting and pushing on to the truck loading place (average distance 200 meters) waterlogged and submerged (the depth up to 1 meter) shrubs and certain trees along with roots and rotten, putrid clod by marsh tractor (T-170 or similar)	ha	17.4	
		m3	600* (1200)**	
	Partition of timber	m3	160	
	Loading bush and tree roots, along with rotten, putrid mass on a truck by CAT 428E or similar excavator	m3	1200	
	Transportation on average distance of 10 km	m3	1200	
	<b>Total</b>		<b>17.4</b>	
3	Uprooting and pushing on to the truck loading place (average distance 200 meters) waterlogged and submerged (the depth up to 1 meter) trees and shrubs along with roots and rotten, putrid clod by marsh tractor (T-170 or similar)T	ha	10	
		m3	450* (900)**	
	Partition of timber	m3	280	
	Loading bush and tree roots, along with rotten, putrid mass on a truck by CAT 428E or similar excavator	m3	900	
	Transportation on average distance of 10 km	m3	900	
	<b>Total</b>		<b>10</b>	
4	Uprooting submerged (more than 1 meter depth) trees and shrubs by WATERMASTER CLASSIC III tractor	ha	13.5	
		m3	510* (765)**	
	Loading on the ПТС-М self-propelled raft, shipping and unloading on the coast tree and shrub roots, along with rotten, putrid mass	m3	765	
	Partition of timber	m3	330	
	Loading wood, brushwood and roots, along with rotten, putrid mass on a truck by CAT 428E or similar excavator	m3	765	
	Transportation on average distance of 10 km	m3	765	
	<b>Total</b>		<b>13.5</b>	
<b>Total in Vardenik branch</b>			<b>58</b>	

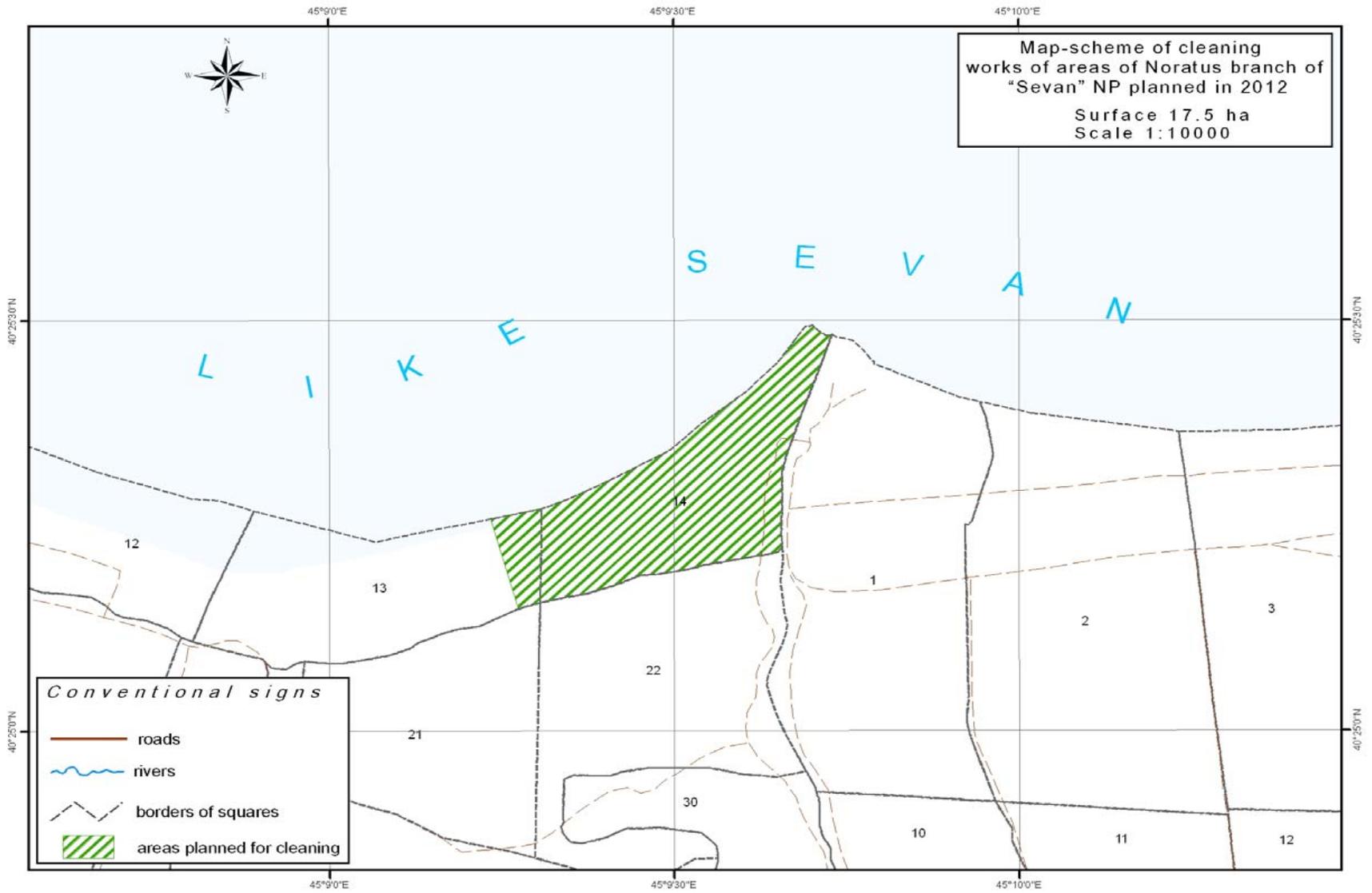
N	Title of works and services	Unit of measure	Volume	Total
<b>Vardenis branch</b>				
1	Uprooting submerged (more than 1 meter depth) shrubs and certain trees by tractor WATERMASTER CLASSIC III	ha	16	
		m3	420* (630)**	
	Loading on the ПТС-М self-propelled raft, shipping and unloading on the coast shrubs, certain trees and roots, along with rotten, putrid mass	m3	630	
	Partition of timber	m3	120	
	Loading of wood, brushwood and roots, along with rotten, putrid mass on a truck by CAT 428E or similar excavator	m3	630	
	Transportation on average distance of 10 km	m3	630	
	<b>Total</b>		<b>16</b>	
2	Uprooting and pushing on to the truck loading place (average distance 200 meters) waterlogged and submerged (the depth up to 1 meter) shrubs and certain trees along with roots and rotten, putrid clod by marsh tractor (T-170 or similar)	ha	5	
		m3	150* (300)**	
	Partition of timber	m3	75	
	Loading bush and tree roots, along with rotten, putrid mass on a truck by CAT 428E or similar excavator	m3	300	
	Transportation on average distance of 10 km	m3	300	
	<b>Total</b>		<b>5</b>	
3	Uprooting and pushing on to the truck loading place (average distance 200 meters) waterlogged and submerged (the depth up to 1 meter) trees and shrubs along with roots and rotten, putrid clod by marsh tractor (T-170 or similar)	ha	19	
		m3	810* (1620)**	

	Partition of timber	m3	400	
	Loading bush and tree roots, along with rotten, putrid mass on a truck by CAT 428E or similar excavator	m3	1620	
	Transportation on average distance of 10 km	m3	1620	
	<b>Total</b>		<b>19</b>	
4	Uprooting submerged (more than 1 meter depth) trees and shrubs by WATERMASTER CLASSIC III tractor	ha	10.3	
		m3	300* (450)**	
	Partition of timber	m3	60	
	Loading wood, brushwood and roots, along with rotten, putrid mass on a truck by CAT 428E or similar excavator	m3	450	
	Transportation on average distance of 10 km	m3	450	
	<b>Total</b>		<b>10.3</b>	
<b>Total in Vardenis branch</b>			<b>50.3</b>	
<b>Total in "Sevan" National park</b>			<b>170.0</b>	
<b>Profit 10%</b>				
<b>Total</b>				
<b>VAT 20%</b>				
<b>Whole</b>				

\* Biomass resource

\*\* Biomass resource including rotten, putrid clod





Map-scheme of cleaning  
works of areas of Vardenik branch of  
"Sevan" NP planned in 2012

Surface 58 ha  
Scale 1:60000

