

Final Report Watershed Assessment for threatened fish in Halgurd-Sakran Park, Iraqi-Kurdistan



CLP Project ID Number: 05285016

Host Country: Kurdistan, Iraq
Site Location: Halgurd-Sakran Park
Project Start: 1 July 2016
Project End: 30 December 2017

Institutions involved in the project:
Waterkeepers Iraq & Halgurd-Sakran Park

Project Aim:
Assess fish and habitat threats in Halgurd-Sakran Park area of Iraqi Kurdistan and increase awareness among local people and decision-makers.

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Table of Contents

SECTION 1:	3
SUMMARY	3
INTRODUCTION	3
PROJECT MEMBERS	4
SECTION 2:	4
AIM AND OBJECTIVES.....	4
CHANGES TO ORIGINAL PROJECT PLAN	5
METHODOLOGY	5
OUTPUTS AND RESULTS	6
COMMUNICATION & APPLICATION OF RESULTS.....	8
MONITORING AND EVALUATION	8
ACHIEVEMENTS AND IMPACTS	9
CAPACITY DEVELOPMENT AND LEADERSHIP CAPABILITIES.....	9
SECTION 3:	10
CONCLUSIONS	10
PROBLEMS ENCOUNTERED AND LESSONS LEARNT	10
FUTURE PLANNED ACTIVITIES.....	11
FINANCIAL REPORT	12
ACKNOWLEDGEMENTS.....	14
SECTION 4:	15
APPENDIX 1: CLP M&E MEASURES TABLE	15
APPENDIX 2: DATA	17
RAW DATA – THREAT ASSESSMENT	17
RAW DATA – FISH SURVEY	23
APPENDIX 3: BROCHURE (ENGLISH VERSION)	26
APPENDIX 4: MAPS	27
APPENDIX 5: LIST OF PRESENTATIONS	29
BIBLIOGRAPHY.....	30
ADDRESS LIST AND WEB LINKS	30
DISTRIBUTION LIST	31

Project Partners & Collaborators

The following people assisted in the project:

- Original Team Members: Nabil Musa (Team Leader, Waterkeepers Iraq), Qader Smael (Halgurd-Sakran Park), & Mohammad Abdulla Ahmed (Halgurd-Sakran Park)
- Additional Team members: Bakhtyar Bahjat (Halgurd-Sakran Park) & Mohammed Amin (local fisherman)
- Project Advisors: Dr. Jörg Freyhof (Germany) , Younis Sabir Abdullah (Sulaimani, Kurdistan, Iraq), Haider Ibrahim (Basrah, Iraq), Prof.Dr. Fıtnat Güler Ekmekçi (Ankara, Turkey)
- Assistants in the fieldwork and outreach: Mohammed Abdullah Ahmed, Bakhteyar Bahjat, Dlzar Qader
- Film editing & production: Hardey Mama Qalla
- Instructors: Dr. Jörg Freyhof & Younis Sabir Abdullah
- Program & Financial Administration: Rozhan Abdulrahman & Mohammed Kamil
- Report Editors: Anna Bachmann, Pommelién da Silva Cosme & Kathy Fuad

Section 1:

Summary

In a joint project, Waterkeepers Iraq and Halgurd-Sakran Park staff conducted a watershed assessment for threatened fish within the Halgurd-Sakran Park, which is located in Erbil Governorate, Kurdistan, Northern Iraq, near the borders with Iran and Turkey.

The project had three objectives: (1) to increase general knowledge and experience doing habitat surveys and watershed assessments for fish species; (2) to conduct a comprehensive watershed survey of rivers and streams within the park boundary, delineating fish habitats and areas of high threat to fish and river ecosystems, and (3) to implement a Awareness Program targeting local people & decision-makers regarding the status of the rivers/streams in the Park, fish biological diversity and threats to biodiversity and river health.

Results included: (1) a survey & identification training led by project advisors Abdullah Younis and Dr. Jörg Freyhof in the Fall of 2016; (2) a threat assessment of the nine rivers within the Park; (3) a fish survey, and (4) the development of educational materials (including two maps, brochures, and a documentary video) and outreach activities about the project to over 1300 stakeholders (including students and teachers from six schools and two universities).

Introduction

The Halgurd-Sakran Park Area includes three identified Key Biodiversity Areas (Halgurd Mountain, Haji Omran, and Sakran Mountain) but has never been assessed for fish or threats to fish habitats. Though at least three fish species listed as Vulnerable by the IUCN could potentially be found in the Park's rivers, there has been no field research in the area due to years of war and political instability.

The area has been informally accepted as a park by the Kurdistan Regional Government (KRG) and has been designated by the Iraqi Ministry of Health and Environment as a site for future protected area development but as of this writing there is no financial or logistical support for the park authority, no management plan and no official designation of the park boundaries. Regardless, there is strong support for the park within the local community, largely as the result of efforts from Abdulwahid Gwany, the former mayor of Choman (the main town nearest the park) who is now deceased. The park, like many areas in Iraqi Kurdistan, suffers from threats such as garbage dumping, dam construction and sewage and oil pollution.

The goal of the project was to train the team made up of staff from Halgurd-Sakran Park and Waterkeepers Iraq in habitat survey techniques, to collect information on fish in the park's rivers, and to educate local stakeholders about the need for river conservation. Waterkeepers Iraq acted as the lead on the project but Halgurd-Sakran Park staff organized and coordinated much of the work within the park boundary (see Map 1 below).



Map 1: Map of Project Area showing the nine rivers that were the subject of the study

Project members

The project members included Nabil Musa, the Iraq Upper Tigris Waterkeeper and Director of Waterkeepers Iraq (WI). Nabil has been with WI since 2011 and is based in Sulaimani, Kurdistan, in Northern Iraq. He has boated the rivers and climbed the mountains of the area for a number of years and is familiar with many areas within the park through outreach work he did during an Expedition of the Choman-Rowanduz River in the area in 2013. Dlzar Qader Smeal was a key member of the team and of Halgurd-Sakran Park from its inception. He conducted education programs for the park and has been a vocal advocate for the park. Additionally, Mohammad Abdulla Ahmed was an original member of the team. At the start of the project, he was recently graduated from the University of Soran in biology. However, due to difficult economic conditions that began with the start of the project Dlzar and Mohammad were unfortunately not able to participate in much of the survey work. Two additional team members Baktyar Bahjat (a Halgurd-Sakran Park staff) & Mohammed Amin (a local fisherman), joined the team and were very active in all the field research. Baktyar is also a manager at Kewsan English Co-education Basic School and teaches in Choman. He is also a member of the Halgurd Mountaineering Group.

Section 2:

Aim and Objectives

Our overall aim was to learn more about the status of fish and fish habitat within Halgurd-Sakran Park Area and increase local awareness about these natural resources. Our three objective were to:

1. Increase general knowledge and experience doing habitat surveys and watershed assessments for fish species through a training conducted by Abdullah Younis and Dr. Jörg Freyhof.
2. Conduct a comprehensive watershed survey of rivers and streams within the park boundary locating important fish habitat and areas of high threat to fish and river ecosystems.

3. Implement an **Awareness Program** targeting local people & decision-makers regarding the status of the rivers/streams in the Park, fish diversity and threats to biodiversity and river health. The Awareness program activities included:
 - Developing a film about the park and the project;
 - Developing a flyer about the project;
 - Developing maps showing the locations of threats and fish found in the park rivers, and
 - Conducting a number of outreach & educational activities.

Changes to original project plan

Changes to the project included the following:

1. Our trainers were not available to start the training until mid-October 2016.
2. We experienced some additional problems in 2017 because of the economic and government situation in Kurdistan Iraq that prevented us from accessing our bank account for two months. This delayed field and outreach work.
3. Later, we faced renewed difficulties in the summer of 2017 because of the deteriorating security situation (caused by fighting in the border region where the park is located). This delayed our data analysis and outreach efforts (the latter started mainly in mid-December 2017) but it also meant that we could not fully cover the Balayan River because the team was not allowed to survey the upper reaches of the river.
4. Due to some of the issues above our original team also changed. Dlzar Qader Smael & Mohammad Abdulla Ahmed were not able to participate in the field work due to the financial problems in the region. Fortunately, Bakhtyar Bahjat, another staff from Halgurd-Sakran Park, and Mohammed Amin, a local fisherman, joined the team and we had assistance from WI volunteers.

Methodology

1. Threat Assessment Method

Our method was to walk and, where riverside roads were available, drive along the river to look for common threats that may impact fish and/or fish habitat. We GPS-located each type of threat and mapped them on a high-resolution map of threats (see Appendix 4). The common threats identified were:

Restaurant sewage	Petrol Stations
Agriculture	Gravel Mining & related cement shops
Fish farms	Garbage dumping
Oil spills/dumps	Bridges (that may pose problems for fish passage)
Road (presence &/or construction)	
Picnic and Tourist areas	
Housing developments/Villages	

We also identified areas where no threats were found.

2. Fish Survey Method

This survey was a presence-absence survey with the goal of identifying what species could be found in each river. Two people conducted the survey using the following equipment:

GPS, Camera, Electro-fishing device, nets, a bucket, a fish tank and a notebook for writing down field notes.

The teammate would move up the river from a starting point, operating the electro-fishing device in the water and focus primarily on sampling in moving water to a pre-determined stopping point. The second teammate would follow downstream with a net to catch any fish that were missed by the first person. Fish that were caught were placed in a bucket and then relocated to the fish tank to be photographed in front of a black background.

Some smaller rivers or seasonal streams had only two sample locations; other rivers such as Azady River had many sample locations (these locations were all placed on a high resolution map, see Appendix 4).

Outputs and Results

1. Capacity Building

On 12 October 2016, we held the first part of the training on the theory behind fish surveys conducted for the team by Abdullah Younis for the three project team members. Capacity Building The training covered: Fish sampling, introduction to fish identification, and internal anatomy. On 16th October 2016, we started the field-component portion of the training, which lasted 9 days, which took place at rivers both in Sulaymaniyah and in the Halgurd-Sakran area. This part of the training showed the team how to carry out sampling by catching fish using electrofishing, netting, hooks, and how to take fish photos.

		
<i>CLP Theory Training</i>	<i>CLP Field Training with Dr. Freyhof</i>	<i>CLP Field Training</i>

2. Threat Survey

We conducted a threat assessment in the nine rivers of the park, starting in September of 2016 and finishing in August of 2017, with the primary work taking place from April to August 2017. Over this period, preliminary surveys were conducted to define the survey area (in September & October 2016 and April 2017) and 5 survey trips were conducted to evaluate and GPS-mark the threats that were observed.

From the data collected a map was developed indicating each threat type on the map and where it was found in the different watersheds. Typical threats seen were: restaurants developed very close to the river, farming activities including fish farms, oil dumping, road development, picnic and tourist area development and use, construction of houses close to the river, gas stations, gravel mining, garbage dumping (much of which was related to the activities previously listed) and many poorly constructed bridges that pose barriers to fish passage. See Appendix 2 for the data and Appendix 4 for the map.

		
<i>Gravel mining</i>	<i>Garbage dumping</i>	<i>Wastewater pipeline to river from a gas station</i>

3. Fish Survey

Fish surveys started with the training in October 16th, 2016 and finished on January 2018 (with the primary work being done during the training and during 4 trips in October & December 2017 and January 2018). Again preliminary surveys were done to define the sampling locations. Four trips were conducted for the survey. Dr. Jörg Freyhof, who loaned us an electro-fishing device, which greatly aided in capturing and photographing fish during the survey. While we did not find any of Iraq's threatened species during these surveys, nine fish species were recorded from five different watersheds, belonging to three different families: Cyprinidae, Nemachilidae, and Siluridae. See Appendix 2 for the full list of fish and their locations and Appendix 4 for the map.

		
<i>Fish Survey</i>	<i>Fish Photography: Garra rufa</i>	<i>Glyptothorax sp. - Azadi River</i>

4. Outreach

The Awareness program produced a short video about the project¹; an educational flyer (see Appendix 3) of which 1500 copies were printed for the outreach work; and two maps - one showing the location of the different fish species that were found and another maps showing the location of the threats we found (see Appendix 4). Approximately 1500 copies of the maps were distributed.

Ten individual outreach events were conducted for schools in the Halgurd-Sakran area (near Choman, Kurdistan, Iraq) as well as in Sulaymaniyah, Kurdistan, Iraq. These presentations were made to an approximate total of six grade school student groups, two college student groups, and three government and local community stakeholders. In addition, interviews about the project were done and the documentary short was shown on local media. See a full list of presentations in Appendix 5.

¹ <https://www.youtube.com/watch?v=loTfiN-buYA>



Communication & Application of results

First the data was organized and the short, video documentary was made to use for outreach work. This was upload to our Waterkeepers Iraq Youtube channel, and included in a link on our website, Facebook page and Twitter Account. We also were able to get local television to play the video. We also did live interviews on local television and radio and promoted the project and the short video during these opportunities. For the data, we synthesized our findings and presented them geographically on the two high quality maps (see Appendix 4), which were distributed along with a flyer (see Appendix 3) with the findings of the project. We developed a presentation on the findings of the survey work as well and along with the maps, brochures, and video made a number of presentations during the project (see Appendix 5).

The presentation, flyer, video documentary, maps and all the photo documentation from the fish sampling and the threat assessment where used to raise awareness in our target audience about the current problems that need to be addressed in the park rivers and the presence, status and impact to threatened fish and fish habitat.

Monitoring and Evaluation

The team members completed a written evaluation of the project in the spring of 2017 to assess the following questions:

1. How well did the project achieve Objective #1: Increasing general knowledge and experience doing habitat surveys and watershed assessments for fish species? What went well? What problems did you see?
2. How well did the project meet Objective 2#: To conduct a comprehensive watershed survey of rivers and streams within the park boundary delineating fish habitat and areas of high threat to fish and river ecosystems? What went well? What problems did you see?
3. How well did the project meet Objective #3: Implementing an Awareness Program targeting local people & decision-makers regarding the status of the rivers/streams in the Park, fish biological diversity and threats to biodiversity and river health? What went well? What problems did you see?

Most of the team comments were used in the completion of this report. Advisors were also solicited for their input but only provided general feedback. Waterkeepers Iraq remains in regular contact

only with Younis Abdullah, who is located in Sulaymaniyah and had been very helpful throughout the project.

Achievements and Impacts

Dr. Freyhof, one of our scientific advisors was pleased with our project achievements and has circulated our findings to experts he knows and put the video on his website. Our team did not have a strong scientific background but we were able to collect some very useful scientific data on fish and identify areas where fish habitat is threatened. It is preliminary and basic work and much more needs to be done, but it is an important beginning.

We received very strong, positive reactions from the school students and got them questioning many of the problems that they took for granted: for example, showing them why the oil spills in the river are bad. Getting them to question the impacts of gravel mining. Asking them to envision what the future look like for these rivers. This awareness-raising effort has been very important for the local community's understanding of environmental issues.

This region has been badly neglected and affected by war and conflict. However, it remains a naturally rich and beautiful area, and local efforts for the development of the Park are gaining support. The greatest advocate for the Park (the former Mayor of Choman, Abdulwahid Gwany) passed away in 2017, but the CLP Project has helped to keep the momentum going. Dlzar Smael presented information on the project to the Erbil Governor (Mr. Nawzad Hadi) who promised his strong support for the Park. The project has helped people realize that this area is worth protecting.

Capacity Development and Leadership capabilities

The team members and volunteers who helped in the project had only general environmental knowledge at the start of the project and no expertise in identifying the species of fish that existed in area streams. With the completion of the survey we now can identify many types of fish that we have.

However in our opinion, the data from the project (especially the video) has given us important tools as we develop future environmental events. We can speak with greater authority with the local people. Villagers are realizing that even five years ago they easily could fish and swim in the Park's rivers but due to the increasing threats that we identified in the Park rivers, they are losing these unique jewels and must work hard to bring them back.

The project also allowed the team to build stronger relationships and trust with key local and government stakeholders. The core team along with volunteers from Waterkeepers Iraq also strengthened their ties. We learned how to collaborate effectively, help one another, organize, and some even learned how to camp!

So, the project has three main benefits for the team: 1) increasing our own knowledge of fish species, fish habitat and river threats; 2) giving us better tools to further conservation awareness and to contribute to the design of future management plans for the Park Rivers, and 3) building relationships and strengthening our core team and volunteers.

Section 3:

Conclusions

This project conducted an assessment and inventory of the general health and threats to fish habitat in the nine rivers/streams that are present within the Halgurd-Sakran Park Area. The Park includes three Key Biodiversity Areas but has received limited studies and has never been assessed for fish habitat or surveyed for the presence of threatened fish species before we start this project. Local communities didn't know much about the biological diversity of the stream and rivers in the Park. The project allowed us to make clear map and collect GPS-located data for our survey results on fish and river threats. With the maps, fliers, a project video and many presentations, we also helped local people from this area to understand what was happening to their rivers and get the discussion going about how to protect the area. These waterways are under threat from activities such as gravel mining, garbage dumping, dam construction, and pollution. They have also faced threats from war and political instability.

We developed many new contacts with government stakeholders and the local village leaders. Currently, we are working with the mayor of Choman to raise awareness about gravel mining effects. We also have a plan to do River Festival with the Choman Tourist Department and will continue working to raise awareness about all the pollution we identified. By providing the local youth and communities with scientific information we were heartened to see the response we received as many in the community do want to protect the rivers.

Problems encountered and lessons learnt

- Which project activities and outcomes went well and why?
 1. With the training and assistance from our advisors we were able to identify all the fish found in the survey and this was very interesting information to share with local peoples who don't know very much about the ecology of the rivers. We found that people were relatively unaware of these nine beautiful rivers in this area and about the pollution and other threats they face, so it was a very positive experience to be able to share this information with the local communities.
 2. The making of the documentary added an important dimension to the project. It was shown in all the local media channels and a journalist from National Geographic even got to see the film and find out about the CLP project and the park (we recently learned that this journalist is pursuing a story about the park for the magazine).
 3. The maps were also very helpful in showing people where the park is located.
- Which project activities and outcomes have been problematic and in what way, and how has this been overcome?
 1. Because this area is closest to the Iranian border and also to Qandil Mountain, which is militarized zone, it made movement within certain areas difficult. Both Iran and Turkey frequently shell the area. This also made staying in the area for very long difficult. There are also a lot of minefields in the region and we needed to ask a lot of people about how to reach areas safely, particularly on rivers like Azady that come from Iran, and also because of the difficulty of doing fieldwork in some area, I had to restrict my survey work and emphasized the outreach work more.
 2. We also had some unexpected changes and expenses in the project, the timing of its activities, etc. due to the economic and political situation.
 3. Lastly, due to the impact of economic sanctions placed on the Kurdistan Regional Government and the death of the main proponent of Halgurd-Sakran Park (Abdulwahid Gwany), funding for the park was cut and Dilzar Smael and Mohammed A. Ahmed

where not able to participate in much of the field work. While they remain advocates for the park and supporters of this work, we resolved this issue by using more volunteers in our field work but were also lucky to secure the assistance of Bakhtyar Bahjat & Mohammed Amin.

Future planned activities

The local KNN radio station still hosts Nabil Musa of Waterkeepers Iraq every Tuesday in a morning talk show about different water issues, and we continue to talk about the project and show the project video in most of our outreach works. We'll be releasing this report, once complete, to our website and get it out to our distribute list as well as to regional media.

Currently we are planning a River Festival for the Park and have submitted a proposal to a new potential funder that would allow us to do a nine-month project to address plastic pollution in the park. Momentum continues to build for the park despite the many challenges it faces. The park was featured this year in a [National Geographic Article](#)² and the area remains on the Iraqi Ministry of Health and Environments priority list for protected area development.

Waterkeepers Iraq and the Halgurd-Sakran Park advocates have also built a very strong relationship of mutual trust and support. We faced many challenges in the project because of the political situation and conflicts in the region, but the core team remained strong throughout the project and looks forward to working together in the future.

² <https://www.nationalgeographic.com/photography/proof/2018/march/iraq-halgurd-sakran-national-park-conservation/?beta=true>

Financial Report

Itemized expenses	Total CLP Requested (USD)*	Total CLP Spent (USD)	% Difference	Details & Justification (Justification must be provided if figure in column D is +/- 25%)	Proposed Spending (Preliminary Report Only)
PHASE I - PROJECT PREPARATION					
Communications (telephone/internet/postage)	240.00	240.00	0%		
Field guide books, maps, journal articles and other printed materials					
Insurance					
Visas and permits					
Team training	725.00	848.00	17%	Underestimated cost for training; Funds reallocated from Equipment	
Reconnaissance					
Other (Phase 1)					
EQUIPMENT					
Scientific/field equipment and supplies	565.00	380.00	-33%	Overestimated cost for supplies; Un-used funds were reallocated to cover training (\$123) and part of photographic equipment (\$62)	
Photographic equipment	450.00	560.00	24%	Underestimated cost for photography equipment; Funds reallocated from Scientific Equipment & Food expenses	
Camping equipment					
Boat/engine/truck (including car hire)	1,200.00	1623.63	35%	Had additional expenses for the maintenance of the WI truck, which we reallocated from travel expenses and other WI funds	
Other (Equipment)	140.00	220.00	57%	We had borrowed an electro-fishing device and had	

Itemized expenses	Total CLP Requested (USD)*	Total CLP Spent (USD)	% Difference	Details & Justification (Justification must be provided if figure in column D is +/- 25%)	Proposed Spending (Preliminary Report Only)
				unexpected costs related to returning it to Dr. Freyhof	
PHASE II - IMPLEMENTATION					
Accommodation for team members and local guides					
Food for team members and local guides	6,160.00	5180.00	-16%	Some of these funds were reallocated to cover part of photographic equipment costs (\$48), other equipment costs \$80) and a portion of outreach materials (\$755)	We will have some additional expenses related to final outreach work
Travel and local transportation (including fuel)	1,320.00	1019.71	-23%	Some of these funds were reallocated to maintenance for the NI truck/under equipment	We will have some additional expenses related to final outreach work
Customs and/or port duties					
Workshops					
Outreach/Education activities and materials (brochures, posters, video, t-shirts, etc.)	1,095.00	1850.00	69%	We underestimated the cost for outreach materials and the shortfall was covered from food expenses	
Other (Phase 2)					
PHASE III - POST-PROJECT EXPENSES					
Administration					
Report production and results dissemination	10.00		-100%	Not spent	We now don't anticipate any additional costs for copying reports.
Other (Phase 3)	595.00	595.00	0%		
Total	12,500.00	12,516.34			



Acknowledgements

We want to send a special thanks to our trainers and advisors Younis Sabir Abdullah & Dr. Jörg Freyhof. Dr. Freyhof helped the project very much with the loan of the electro-fishing device. Also thanks to our additional advisors Haider Ibrahim & Dr. Fıtnat Güler Ekmekçi. Rozhan Abdulrahman was a great help in developing this report and Kathy Fuad, Pommelién da Silva Cosme and Anna Bachmann assisted with English language editing.

Section 4:

Appendix 1: CLP M&E measures table

Output	Number	Additional Information
Number of CLP Partner Staff involved in mentoring the Project	0	But support was provided when we needed to make scheduling changes
Number of species assessments contributed to (E.g. IUCN assessments)	0	Not an objective of the project
Number of site assessments contributed to (E.g. IBA assessments)	0	Not an objective of the project
Number of NGOs established	0	While no new NGOs were started, the project helped to establish and build the reputations for both Halgurd-Sakran Park and Waterkeepers Iraq in the project area
Amount of extra funding leveraged (\$)	~4000 USD	This represents WI funds that supported staff time and some additional travel related to outreach (much of which occurred in 2018) which was provided by an EU-sponsored Project; effectively this number is much higher as the Waterkeeper and the H-S Park Staff volunteered much of their time on the project.
Number of species discovered/rediscovered	9	
Number of sites designated as important for biodiversity (e.g. IBA/Ramsar designation)	3	The park contains 3 KBA sites designated important for birds, plants, fish and mammals
Number of species/sites legally protected for biodiversity	0	
Number of stakeholders actively engaged in species/site conservation management	3 with 4 volunteers	Halgurd-Sakran Park staff continue to be engaged in conservation despite little financial or logistical support
Number of species/site management plans/strategies developed	0	Not an objective of the project
Number of stakeholders reached	1330	This does not include viewership for the film and information shown on local television and online
Examples of stakeholder behaviour change brought about by the project.	2 gravel mines were closed by local authorities during and partially as a result of the	Also local people are more aware of the specific threats to their rivers and aware

Output	Number	Additional Information
	project	
Examples of policy change brought about by the project	0	None as yet
Number of jobs created	0	We hope ... maybe in the future
Number of academic papers published	0	No immediate plans but possibly in the near future.
Number of conferences where project results have been presented	0	Younis (our advisor and one of our instructors) hopes to present our data at future meetings

Appendix 2: Data

Fish List

Scientific names	English common name	Arabic Common names	Kurdish Common names
Alburnoides diclensis		-	-
Alburnus mossulensis	Mossul bleak	طويل سمنا ن	سدف اويلكه
Barbus lacerta	Kura barbell	هوقك شبوط	شله
Capoeta trutta	Trout barb	هوقك تيله	مشارة
Capoeta umbla	Tigris scraper	لغدياي تيله	زقرده
Garra rufa	Red garra	لحو كرکور	خوتةککه
Glyptothorax sp.		صدقنقور	طلدقه
Paracobitis zabgawraensis	Western crested loach	-	طهيرة زابي مئلي
Turcinoemacheilus kosswigi	Kosswig's loach	-	تورکي مئلي

Raw Data – Threat Assessment

#	River name	Location	GPS	Date	Threat
1	Azadi River		preliminary trips for planning the areas to be surveyed	9/16/16	N/A
2	Azadi River		preliminary trips for planning the areas to be surveyed	9/17/16	N/A
3	Rayat River		preliminary trips for planning the areas to be surveyed	9/23/16	N/A
4	Gundazhor river		preliminary trips for planning the areas to be surveyed	10/17/16	N/A
5	Gundazhor river		preliminary trips for planning the areas to be surveyed	10/18/16	N/A
6	Nawanda River		preliminary trips for planning the areas to be surveyed	10/19/16	N/A
7	Nawanda River		preliminary trips for planning the areas to be surveyed	10/20/16	N/A
8	Delza river		preliminary trips for planning the areas to be surveyed	10/21/16	N/A

#	River name	Location	GPS	Date	Threat
9	Basan river		preliminary trips for planning the areas to be surveyed	10/22/16	N/A
10	Basan river		preliminary trips for planning the areas to be surveyed	10/23/16	N/A
11	Sakran river		preliminary trips for planning the areas to be surveyed	10/24/16	N/A
12	Similian River		preliminary trips for planning the areas to be surveyed	4/13/17	N/A
13	Azadi River	Hagi Omran border	N36.6673° E045.05861°	5/8/17	petrol station
14	Azadi River	Hagi Omran village, Bridge Azadi	N36.66800° E045.05105°	5/8/17	agriculture, animal farming, Sewage, garbage, animal grazing
15	Azadi River	Hagi Omran	N36.67230° E045.04176°	5/8/17	agriculture, animal grazing, garbage dump
16	Azadi River	Dump, Dumping ground	N36.67916° E045.02674°	5/8/17	garbage dump
17	Azadi River	Azadi village	N36.68184° E044.98383°	5/8/17	village
18	Azadi River	Gravel mine (Start Point)	Starting point: N36.67866° E044.97772°	5/8/17	Gravel mine, mixing cement (start)
19	Azadi River	Gravel mine (End Point)	Finishing point: N36.67731° E044.97120°	5/9/17	Gravel mine, mixing cement (end)
20	Azadi River	Rayat village	N36.68396° E044.97143°	5/9/17	houses, sewage, garbage
21	Azadi River	Rayat river	N36.67781° E044.97102°	5/9/17	bridge
22	Azadi River	Fishfarm	N36.66991° E044.94466°	5/9/17	Fish farm, tourist picnic , sewage, garbage
23	Azadi River	Tourist Fishfarm	N36.66810° E044.94242°	5/10/17	Tourist area, fish farm, garbage, sewage
24	Azadi River	Gas station	N36.66631° E044.94001°	5/10/17	Gas station
25	Azadi River	Gundazhor village	N36.66278° E044.92627°	5/10/17	garbage , sewage, houses
26	Azadi River	Petrol Station	N36.65951° E044.91073 °	5/10/17	Petrol station, tourist area.

#	River name	Location	GPS	Date	Threat
27	Azadi River	Houses, Houses Sewage	N36.65748° E044.90865°	6/10/17	Houses, sewage, garbage.
28	Azadi River	Petrol station and cement shop	N36.65448° E044.90329°	6/10/17	Petrol station, cement shop
29	Azadi River	Petrol station, Oil change	N36.65392° E044.90229°	6/10/17	Gas station, changing oil
30	Azadi River	Gas and oil	N36.65324° E044.90229°	6/10/17	Gas station, oil changing
31	Azadi River	Gas and oil	N36.65159° E044.90041°	6/10/17	Gas station and oil changing
32	Azadi River	Gas and oil	N36.65023° E044.89841°	6/10/17	Gas stations, oil changing
33	Azadi River	Oil and mechanic	N36.64928° E044.89650°	6/10/17	Gas stations, oil changing, mechanic shop
34	Azadi River	Gas station	N36.64824° E044.89447°	6/10/17	Gas station
35	Azadi River	Sewage	N36.64369° E044.89032°	6/11/17	Sewage
36	Azadi River	Sewage and garb	N36.64290° E044.89045°	6/11/17	Houses , sewage and garbage
37	Azadi River	Choman's Bridge	N36.64096° E044.89196°	6/11/17	Bridge crossing
38	Azadi River	Oil shop	N36.62992° E044.88160°	6/11/17	Pollution and garbage dumping from changing truck tires and changing oil.
39	Azadi River	Petrol	N36.62732° E044.88123°	6/11/17	Petrol station
40	Azadi River	Petrol	N36.62865° E044.88153°	6/11/17	Petrol station
41	Azadi River	Gas station	N36.62242° E044.88257°	6/12/17	Changing oil & tire, gas station.
42	Azadi River	Picnic	N36.61448° E044.86103°	6/12/17	Tourist and picnic, garbage and sewage.
43	Azadi River	Fish farm	N36.61448° E044.86103°	6/12/17	Fish farm and picnic area .
44	Azadi River	Picnic area , garbage and sewage.	N36.61036° E044.83947°	6/12/17	Picnic area for tourists, garbage and sewage.

#	River name	Location	GPS	Date	Threat
45	Azadi River	Fish farm and houses, garbage and sewage.	N36.60288° E044.8190°	6/12/17	Fish farm and houses, garbage and sewage.
46	Azadi River	Restaurant, fish farm and tourist area, garbage and sewage	N36.59652° E044.81632°	6/12/17	Restaurant, fish farm and tourist area, garbage and sewage
47	Azadi River	Restaurant, fish farm and tourist area, garbage and sewage	N36.59269° E044.81181°	6/12/17	Restaurant, fish farm and tourist area, garbage and sewage
48	Azadi River	Cooler	N36.59217° E044.81084°	6/13/17	refrigerated warehouse
49	Azadi River	Gravel mining	N36.59204° E044.80989°	6/13/17	Gravel mining and construction works
50	Azadi River	Agriculture	N36.59065° E044.80143°	6/13/17	Agriculture
51	Azadi River	Razan Village	N36.58861° E.044.79435°	6/13/17	Razan village, sewage.
52	Azadi River		N36.58870° E044.79068°	6/13/17	Petrol station, sewage.
53	Azadi River		N36.58443° E044.77391°	6/13/17	Houses, sewage and garbage.
54	Azadi River		N36.58115° E044.76281°	7/17/17	Picnic and tourist place, garbage and sewage.
55	Azadi River		N36.58477° E044.75607°	7/17/17	Houses sewage and garbage.
56	Azadi River		N36.60066° E044.73743°	7/17/17	Houses, sewage and garbage.
57	Azadi River	Pashkolla Village	N36.59850° E044.73006°	7/17/17	Pashkolla village.
58	Azadi River		N36.59991° E044.71106°	7/17/17	Petrol station, bridge.
59	Rayat River	Rayat river	N36.68396° E044.97143°	8/2/17	Houses, sewage and garbage
60	Rayat River	Rayat village	N36.68396° E044.97143°	8/2/17	Houses, sewage and garbage
61	Gundazhor River	Gundazhor	N36.67072° E044.92564°	8/2/17	Houses , sewage and garbage
62	Gundazhor River	Azadi	N36.66278° E044.92627°	8/2/17	sewage and garbage

#	River name	Location	GPS	Date	Threat
63	Nawanda River	Nawanda village	N36.67304° E044.89363°	8/2/17	Houses, sewage, garbage, road and agriculture
64	Nawanda River	Nawanda	N36.65477° E044.90239°	8/3/17	Houses, sewage and garbage
65	Delza River	Kawnakhan	N36.64479° E044.87051°	8/3/17	Houses, garbage, road and sewage
66	Delza River	Delza	N36.63306° E044.88860°	8/3/17	Houses, road, sewage and garbage
67	Basan River	Basan starting point	N36.58283° E044.99323°	8/3/17	No pollution and no threats here
68	Basan River	Tourist area	N36.6085° E044.96310°	8/3/17	Tourist and picnic area , sewage and garbage
69	Basan River	Weze village	N36.58696° N044.9880°	8/3/17	Houses, sewage and garbage
70	Basan River	Khushkan	N35.60231° E044.93489°	8/3/17	Tourist and picnic place, houses, sewage and garbage
71	Basan River	Shekhan village	N36.60896° E044.89988°	8/4/17	Tourist place and picnic place, houses, sewage and garbage
72	Basan River	Shekhan bridge	N36.61013° E044.89520°	8/4/17	Picnicking area, Garbage, road, bridge and sewage, This bridge
73	Basan River	Tourist	N36.59396° E044.90500°	8/4/17	Tourist and picnic, sewage and garbage
74	Basan River	Cheek farm	N36.61630° E044.88695°	8/4/17	Chicken farm, tourist place, garbage, sewage
75	Basan River	Nawprdan	N36.61652° E044.87780°	8/4/17	Sewage and garbage , houses
76	Sakran River	Sakran river	N36.59574 E044.90276°	8/4/17	Tourist places, sewage and garbage
77	Balayan River	Balayan	N36.52462° E044.84083°	8/4/17	Picnic area , sewage and garbage
78	Balayan River	Agriculture	N36.50340° E044.80994°	8/4/17	agriculture
79	Balayan River	Prdashal village	N36.50386° E044.80693°	8/4/17	Houses, sewage, animal grazing and garbage
80	Balayan River	Bargrga village	N36.51275° E044.79874°	8/7/17	Houses, sewage, garbage and agriculture.

#	River name	Location	GPS	Date	Threat
81	Balayan River	Gojar village	N36.51949° E044.78764°	8/7/17	Houses, sewage, and garbage
82	Balayan River	Dump	N36.52539° E044.78141°	8/7/17	village, garbage dump
83	Balayan River	Khanaqa	N36.53168° E044.77356°	8/7/17	Houses, sewage, garbage, agriculture, road, and animal grazing
84	Balayan River	Sarnaws	N36.54600° E044.76302°	8/7/17	Houses, sewage, garbage, agriculture, road, and animal grazing
85	Balayan River	Razhukareyan village	N36.55698° E044.74863°	8/8/17	Houses, sewage, garbage, agriculture, road, and animal grazing
86	Balayan River	Gravel mine	N36.56590° E044.74461°	8/8/17	gravel mine, village.
87	Balayan River	Picnic	N36.59441° E044.71621°	8/8/17	village, picnic area, garbage and sewage.
88	Balayan River	Join point	N36.59648° E044.71515°	8/8/17	Bridge, picnicking area, road and garbage
89	Similian River	Rust village	N36.70605 E044.76946	8/8/17	Houses, road, sewage and garbage
90	Similian River	Starting point Similian	N36.68640 N044.74905	8/8/17	Houses, sewage and garbage.
91	Similian River	Similan village	N36.67868° E044.72829°	8/8/17	Houses, sewage, agriculture, animal grazing and garbage.
92	Similian River	Agriculture	N36.66382° E044.7621°	8/9/17	agriculture
93	Similian River	Chomany smail agha village	N36.65770° E044.7621°	8/9/17	House
94	Similian River	Chumbaruk village	N36.64712° E044.70827°	8/9/17	Village
95	Similian River	Gravel Mine Start point - Similian	N36.62257° E044.68991°	8/9/17	Gravel mine (start)
96	Similian River	Gravel mine End point - Similian	N36.62207° E044.68852°	8/9/17	Gravel mine (end)

Raw Data – Fish Survey

River name	Fish name	GPS	Date
N/A	N/A	preliminary trips for planning the areas to be surveyed	8/22/17
N/A	N/A	preliminary trips for planning the areas to be surveyed	8/23/17
N/A	N/A	preliminary trips for planning the areas to be surveyed	8/24/17
N/A	N/A	preliminary trips for planning the areas to be surveyed	8/25/17
N/A	N/A	preliminary trips for planning the areas to be surveyed	10/1/17
N/A	N/A	preliminary trips for planning the areas to be surveyed	10/2/17
N/A	N/A	preliminary trips for planning the areas to be surveyed	10/3/17
Azadi River	<i>Barbus lacerta</i>	N36.6673° E045.05861°	10/4/17
Azadi River	<i>Barbus lacerta</i>	N36.67981° E044.98667°	10/4/17
Azadi River	<i>Capoeta umbla</i>	N36.67772° E044.97100°	10/4/17
Azadi River	<i>Barbus lacerta</i>	N36.67772° E044.97100°	10/4/17
Azadi River	<i>Barbus lacerta</i>	N36.66793° E044.94213°	10/5/17
Azadi River	<i>Glyptothorax sp.</i>	N36.66793° E044.94213°	10/5/17
Azadi River	<i>Tucinoemacheilus Kosswigi</i>	N36.66793° E044.94213°	10/5/17
Azadi River	<i>Paracobitis zabganraensis</i>	N36.66793° E044.94213°	10/5/17
Azadi River	<i>Barbus lacerta</i>	N36.64387° E044.89018°	10/5/17
Azadi River	<i>Glyptothorax sp.</i>	N36.64387° E044.89018°	12/20/17
Azadi River	<i>Capoeta umbla</i>	N36.63252° E044.88844°	12/20/17
Azadi River	<i>Barbus lacerta</i>	N36.63252° E044.88844°	12/20/17
Azadi River	<i>Alburnus Mossulensis</i>	N36.63252° E044.88844°	12/20/17
Azadi River	<i>Paracobitis zabganraensis</i>	N36.63252° E044.88844°	12/20/17
Azadi River	<i>Garra rufa</i>	N36.63252° E044.88844°	12/20/17

River name	Fish name	GPS	Date
Azadi River	<i>Capoeta umbla</i>	N36.59126° E044.81055°	12/21/17
Azadi River	<i>Barbus lacerta</i>	N36.59126° E044.81055°	12/21/17
Azadi River	<i>Alburnoides dielensis</i>	N36.59126° E044.81055°	12/21/17
Azadi River	<i>Glyptothorax sp.</i>	N36.59126° E044.81055°	12/21/17
Azadi River	<i>Capoeta umbla</i>	N36.59707° E044.71608°	12/21/17
Azadi River	<i>Garra rufa</i>	N36.59707° E044.71608°	12/21/17
Rayat River	No water, No fish	N36.68289° E044.97524°	12/27/17
Gundazhor River	<i>Barbus lacerta</i>	N36.67244° E044.92329°	12/27/17
Gundazhor River	<i>Paracobitis zaghanraensis</i>	N36.67244° E044.92329°	12/27/17
Gundazhor River	<i>Tucinoemacheilus Kosswigi</i>	N36.67244° E044.92329°	12/27/17
Gundazhor River	<i>Capoeta umbla</i>	N36.67244° E044.92329°	12/28/17
Gundazhor River	<i>Glyptothorax sp.</i>	N36.67244° E044.92329°	12/28/17
Gundazhor River	<i>Glyptothorax sp.</i>	N36.66798° E044.92541°	12/28/17
Gundazhor River	<i>Barbus lacerta</i>	N36.66798° E044.92541°	12/28/17
Gundazhor River	<i>Paracobitis zaghanraensis</i>	N36.66798° E044.92541°	12/28/17
Gundazhor River	<i>Paracobitis zaghanraensis</i>	N36.6603° E044.92588°	12/28/17
Gundazhor River	<i>Barbus lacerta</i>	N36.6603° E044.92588°	12/28/17
Nawanda River	<i>Barbus lacerta</i>	N36.68195° E044.73607°	1/14/18
Nawanda River	<i>Barbus lacerta</i>	N36.66743° E044.89755°	1/14/18

River name	Fish name	GPS	Date
Delza River	<i>Salamandra salamandra</i>	N36.63519° E044.87077°	1/14/18
Basan River	No water, No fish	N36.60459° E044.93306°	1/14/18
Sakran River	No fish	N36.59574° E044.90276°	1/14/18
Similian River	<i>Barbus lacerta</i>	N36.68195° E044.73607°	1/14/18
Similian River	<i>Barbus lacerta</i>	N36.67053° E044.71154°	1/14/18
Similian River	<i>Garra rufa</i>	N36.67053° E044.71154°	1/14/18
Similian River	<i>Paracobitis zagbavraensis</i>	N36.67053° E044.71154°	1/14/18
Similian River	<i>Tucinoemacheilus Kosswigi</i>	N36.67053° E044.71154°	1/15/18
Balayan River	<i>Barbus lacerta</i>	N36.52446° E044.84100°	1/15/18
Balayan River	<i>Barbus lacerta</i>	N36.51670° E044.83364°	1/15/18
Balayan River	<i>Capoeta umbla</i>	N36.51670° E044.83364°	1/15/18
Balayan River	<i>Garra rufa</i>	N36.50882° E044.82300°	1/15/18
Balayan River	<i>Paracobitis zagbavraensis</i>	N36.54838° E044.75812°	1/15/18
Balayan River	<i>Tucinoemacheilus Kosswigi</i>	N36.54838° E044.75812°	1/15/18
Balayan River	<i>Barbus lacerta</i>	N36.59628° E044.71544°	1/15/18

Appendix 3: Brochure (English version)

Conservation of our Threatened Fish and River Protection

Halgurd-Sakran National Park in Kurdistan, northeastern Iraq contains nine rivers and streams. These are the Sakran, Azadi, Nawanda, Gundazhor, Balayan, Similan, Basan, Delza, and Rayat. The park includes one of the tallest peaks of Iraq (Halgurd Mountain) and represents some of the most remote and pristine areas of the country.

These beautiful and remote rivers and mountains are biologically important but few scientific studies have been conducted here. Three areas within the park have been identified as Key Biodiversity Areas ... areas that are globally important for their biological diversity. The country's last remaining, free-flowing rivers are found here. Many rare and unique animals and plants are yet to be discovered. But the area is also under threat from dams, development, pollution and habitat destruction.

Including the fish listed in this guide, there are likely 35 species of fish that may be found in the waters of the park and in the rivers of Kurdistan Iraq. Also three important species are known globally to be vulnerable to extinction. These rare species found in our waters include Arabibarbus grypus (Shabout), Carasobarbus kosswigi (Kiss-lip Himri), & Luciobarbus esocinus (Pike Barbel).

Common Fish of Halgurd-Sakran National Park and the rivers of Kurdistan Iraq

During the 2017 survey in Halgurd-Sakran National Park nine fish species were recorded from five different stream, belonging to three different families: Cyprinidae, Nemachilidae, and Siluridae.





Barbus lacerta



Alburnus mossulensis



Capoeta trutta



Parscobitis zabgawensis



Capoeta umbra



Glyptothorax sp.



Garra rufa



Alburnoides dielensis



Turcinomachellus kosswigi



Salamandra salamandra

A Project of:




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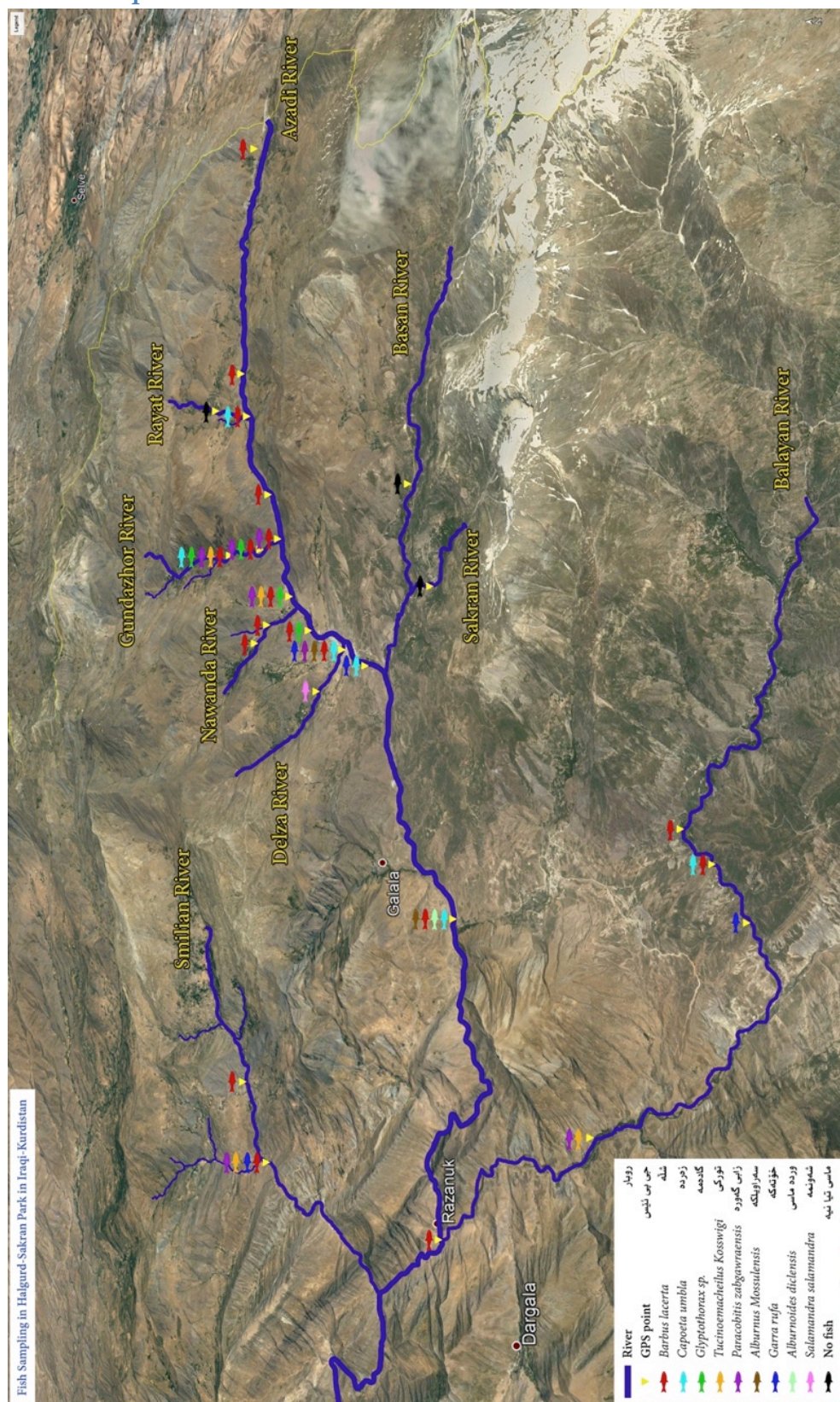

For more information, contact:

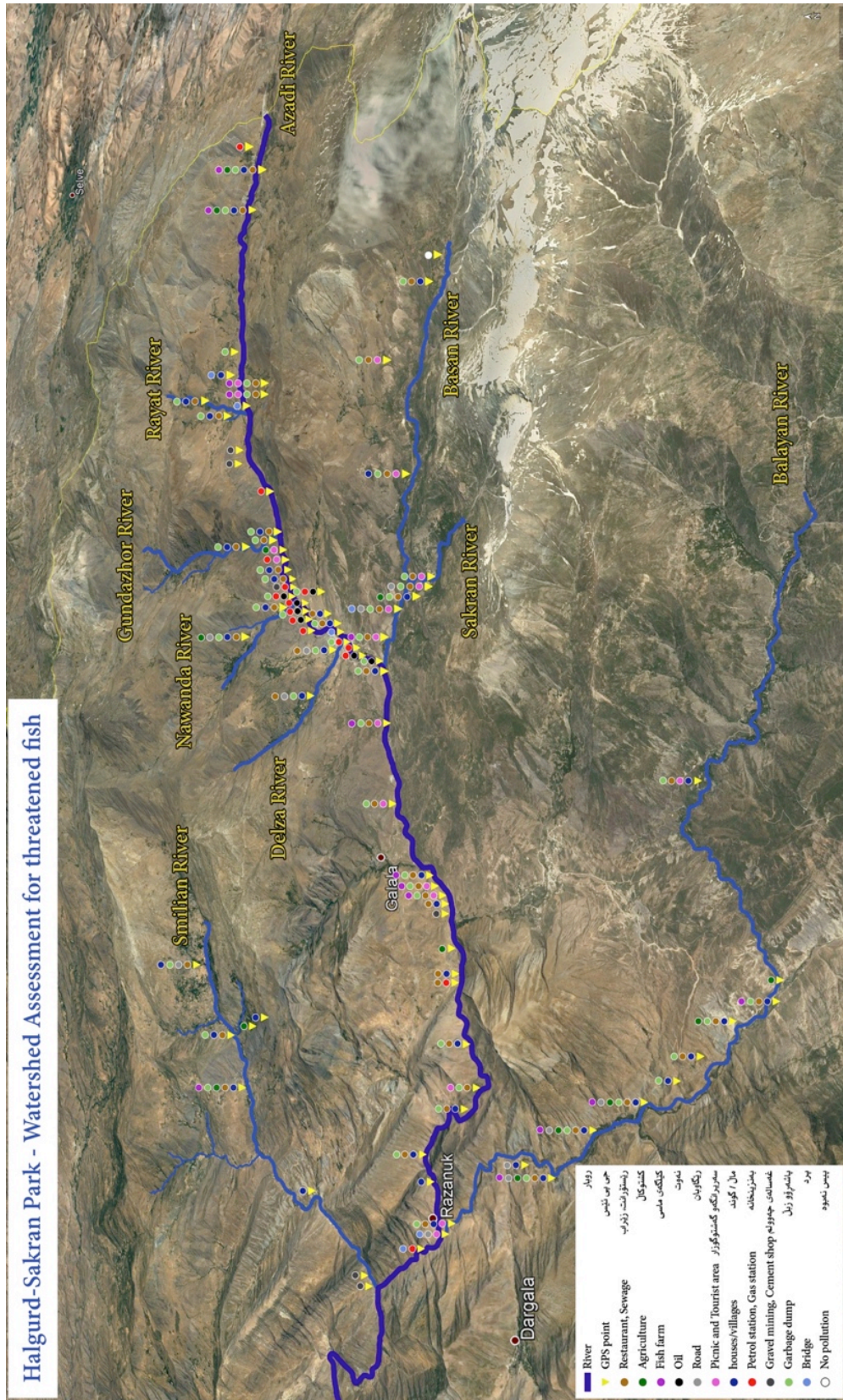
 Halgurd-Sakran Park
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 www.waterkeepersiraq.org
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We must take care to protect our environment for ourselves and for our children.

Please support the work of Waterkeepers Iraq-Kurdistan to protect all rivers and support the sustainable development of the Halgurd-Sakran National Park, the gem of Kurdistan.

Appendix 4: Maps





Appendix 5: List of presentations

- On 27 December 2017, presentations to a group of 120 teenage students at the Federal School for Girls, 40 3rd and 4th graders at Kewsan Basic English School, 50 7th graders at the Pirzha Basic School for Girls, and 40 8th graders at the Weza School for Boys.
- Jan 14th 2018 in Halgurd-Sakran mountainous area the Water Rights Working Group, in collaboration with Halgurd-Sakran National park team, and Halgurd-Sakran Hiking Club, which is led by Salar Chomani with his colleague Kamal Chomani, the local tourist department and some policeman of Choman district and the Mayor of Choman attended a presentation which was held by Nabil Musa. The presentation was about the CLP project and EU project on water rights, with presentations, videos and documentary films, also distributions of printed materials. At least 15 people attended this event.
- The same series of activities were presented in four schools located near the park on the same day (Jan 14th, 2018) for approximately 300 students, then a meeting was held with the Mayor and the Tourism director of Choman for more discussion about protecting the park, and they were provided with the documentary about the project as well as other environmental films WI has made.
- Jan 16th & 17th 2018 the CLP film played by a WI volunteer for 260 students at the British International School under EU logos; students received more information about environment pollution and how they can stop polluting by writing a short report as a feedback from the presented films.
- Jan 22th 2018, Nabil Musa was interviewed on the Khak TV Channel about the project and CLP video was shown. It was also shown to the Water Rights Working Group (part of another initiative that WI is working on under an EU-funded project that includes several Kurdish environmental and community organizations)
- February 9th 2018 at the Cigarette Factory (a community center in Sulaymaniyah) the Water Rights Working Group members participated in an event, which included information on the Halgurd-Sakran Park Project including the printed material from the project. Approximately 40 people attended.
- February 22nd 2018 an event was done in Soran district in collaboration with Aweza Organization and the Earth Network at Truska Elementary School for Girls for 35 students and 25 members of Aweza as well as some Truska teachers.. This event consisted of a series of presentations that included the CLP project, with showing the short documentary film on the project and distributing the project printed flyer and maps.
- March 9th 2018 was another event and presentation about the project at the Cigarette Factory for approximately 30 people.
- March 16th 2018 at 11 am. Waterkeepers Iraq collaborated with other members of the Water Right Working Group with community organizations from the Cigarette Factory on an event at Dukan Lake in honor of the International Day of Action for Rivers. Many picnickers were involved in a beach cleaning that occurred and information on the Halgurd-Sakran project was provided at the event. Approximately 25 people participated.
- On April 22nd, 2018 the Water Rights Working Group participated in the Green Festival in the Biology Department at the University of Sulaimany. They invited Waterkeepers Iraq and the Environment Keeper group of the American University of Iraq-Sulaimani to participate. Approximately 300 students and their teachers participated and Nabil talked about some of the unique type of fishes in the Halgurd-Sakran National Park. Also showed the Halgurd-Sakran National park (CLP) video.

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WEBLINKS

Brian Coad's Freshwater Fishes of Iraq.
http://www.briancoad.com/main.asp?page=TitlePage_Iraq.htm

IUCN Red List of Threatened Species: <http://www.iucnredlist.org/>

FishBase: <http://www.fishbase.org/>

Nature Conservancy's Freshwater Ecosystems of the World (FEOW):
http://www.feow.org/ecoregions/details/upper_tigris_euphrates

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