

Report on Participatory Monitoring of Fish Conservation Zones around Hin Nam No NPA

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Executive Summary

The Hin Nam No NPA is governed through a system of co-management where 19 local communities are engaged in the management of conservation and sustainable use of natural biodiversity resources. Linkages between livelihoods and conservation such as Fish Conservation Zones (FCZ) are being promoted to motivate local communities to take an interest in conservation.

FCZ have been supported by the Livelihoods Unit of the NPA in four villages in 2014. Three more villages are to be added in 2016. The goal of these FCZ is to conserve mother fish stocks in deep parts of the rivers to ensure good fish catches in adjacent waters. Fish is often the single most important source of protein for villagers, so FCZ directly contribute to local food security and good nutrition. In each village, rules for the management of FCZ have been agreed and committees were elected to supervise the implementation of these rules.

However, FCZ committee members do not yet have a good methodology for monitoring the impact of the FCZ on fish catches in adjacent waters. Such methods for monitoring the impact of FCZ have already been developed and applied elsewhere in Laos by NGOs such as WWF. Three national consultants were recruited to guide the Hin Nam No Livelihoods Unit in developing a system for participatory monitoring of FCZ. This report summarizes the results.

An interview form for household interviews was designed to record fish consumption. The households to be interviewed were selected randomly from lists provided by the village headman. Secondly, a number of 636 fishes were tagged in three locations, covering 17 species. All villages in Boualapha district have been asked to report back any tagged fish caught. The results are expected to be available by the end of 2016.

A total of 58 households were interviewed in the four villages where FCZ already exist. On average, 90% of all fish consumed is derived from waters in rivers around the FCZ. The average fish consumption per household was 106 kg per year. This is equivalent to an intake of 48 grams of fish per capita per day, which is 70% of the national average of 70 grams per capita per day.

The average value of fish caught per year per FCZ amounts to 172 million kip (\$23,395) per year. Per household the fish consumption is worth 201,042 kip per month, which is equivalent to 25% of baseline household income measured in 2012 (793,000 kip per household per month).

Overall, the rules of the FCZ are well understood (86%) and agreed (100%) by members of the 58 households interviewed. Almost all households (97%) report better fish catches as a result of the FCZ. One lesson learned is the broad support among the communities for the concept of FCZ. All villages supported this idea and they believe it has a positive impact on fishing around the zones. Therefore, there is a very good chance that the FCZ will be continued. Most villages reported benefits of more fish from the areas around the zones, and that they would continue to follow the regulations. The formal support and approval by the various District authorities is important and should be maintained. FCZ should be established in all 19 NPA guardian villages.

1 Introduction

The Hin Nam No National Protected Area (NPA) is governed through a system of co-management where local communities are engaged in the management of conservation and sustainable use of natural biodiversity resources. Livelihoods linkages to conservation are being promoted to motivate local communities to take an interest in conservation.

The Livelihoods Unit has supported the establishment of FCZ in four villages in 2014. Three more villages are to be added in 2016. The goal of these FCZ is to conserve mother fish stocks in deep parts of the rivers to ensure good fish catches in adjacent waters.

Fish is often the single most important source of protein for villagers, so FCZ directly contribute to local food security and good nutrition. In each village, rules for the management of FCZ have been agreed and committees were elected to supervise the implementation of these rules.

2 Objectives

Overall objective

To strengthen the capacity of the Livelihood Team within the Hin Nam No National Protected Area (NPA) Management Unit to support participatory monitoring of the impacts of Fish Conservation Zones (FCZ) by inhabitants of six communities around Hin Nam No NPA based on a baseline of estimated fish catches per household per year.

Purposes of Fish Conservation Zones (FCZ) Assessment

- To implement the Monitoring and Evaluation of the activities of the project for establishment of the FCZs in order to draw some lessons to develop
- To give opportunities for people to share comments and seek new direction to integrate the local wisdom with modern technical inputs, to build and upgrade the technical capacity and knowledge of local communities in managing the existing resources and increasing the productivity in an independent manner;
- To learn and accept different suggestions of the communities so that the project can consider and find ways to improve and develop the project strategy in Natural Resources Management so that it can be responsive to basic needs of local people both in term of food consumption and income generation, however, it needs to be balanced for the sake of sustainability.
- To act as the agent/tool to disseminate the information from the grassroots to the general public and stakeholders involved in the Government's policy and development programs.

3 Methodology

3.1 Fish Conservation Zones (FCZ) Assessment

3.1.1 Questionnaire for individual household interview

Individual person or household interview were held from individual households, is the taking time to meet and observe their livelihoods, living conditions and fishing equipment used. The households to be interviewed were selected randomly from lists provided by the village head. A questionnaire form was prepared, key questions are summarized in section 3.1.2 below.

For coordination and appointment with local authorities, the project followed the working approach of the Government, in which we have letter of Request from the District to the villages. After completing the interviews in all target villages, the assessment team presented the finding to the district meeting by inviting all representatives from relevant organizations/sectors in Boualapha district: Head of DONRE, Hin Nam No National Protected Area (NPA) team, District Staff and Fish Conservation Zone Committee of 4 villages.

3.1.2 Key topics for interviewing

Basic statistics and fishery:

- A. Basic demographic data*
- B. Location and areas of FCZs*
- C. The density of daily uses of fishery resources in the distance of 1 kilometer above and below the FCZs, divided into 2 seasons, (Dry season: 12-5, Rainy season: 6-11) according to international calendar.*
- D. Ranking 5 types of fishing equipment mostly used, frequency of fishing trips per day*
- E. Observations on increases or decreases of fish production and other aquatic resources in the FCZs and the surrounding areas;*
- F. Names of main fish species and other aquatic lives increased by observing from the daily fishery activities of the people.*

Social aspect:

- A. Giving vote to confirm satisfaction or dissatisfaction for establishing the FCZ;*
- B. Understanding and compliance or non-compliance with the FCZs management regulations;*
- C. Information dissemination and the interest of other villages for establishing of the FCZ;*
- D. People's participation in the process of natural resources management;*
- E. Reasons for satisfaction and non-satisfaction.*

Economic aspect:

- A. Total income of the village and other direct and indirect benefits gaining from the FCZs.*

Conclusion:

- A. Issues and bottlenecks in the management, improvement or development of the FCZs;*
- B. Recommendations which are the ideas from the communities for the development, promotion of the sustainable resources management*

Fish Consumption:

- A. *The fish diet of household is important value from the FCZ to compare with elsewhere and aquaculture.*
- B. *The important value of fish consumed of village will be statistic for next monitoring.*

3.1.3 Where and when the assessment was done

The assessment/survey was conducted in Boualapha district of Khammaune province between 3-10 March 2016. Interviews were held in four target villages: Ban Nong Ping, Ban Tha Sa-at, Ban Vangkon and Ban Nong Seng. In 58 households were interviewed, equal to 27% of all households in those villages. Of the respondents, 18 out of 58 (31%) were female.

3.1.4 Overview of the river systems studied

The Xe Bang Fai River is the main tributary of the Mekong in the Central part of Laos, originating from the mountains in and around the Hin Nam No National Protected Area (NPA) in Boualapha district, Khammouane province. Xe Bang Fai has two main tributaries namely Nam Ngo and Nam Oula. the Nam Theun 2 also releases water the central part of Xebangfai river. Two of the villages are situated directly on the upper Xe Bang Fai river: Ban Tha Sa-at and Nong Ping (they are one administrative unit) and two are situated on the banks of the Nam Ngo: Vangkon and Nong Seng.

3.2 Fish Tagging Methodology

Three locations were selected for fish tagging: two along the Xe Bang Fai river: Laboy and Nong Ping and one in Vangkon along the Nam Ngo, a tributary to the Xe Bang Fai river. A total number of 636 fishes were tagged of 17 species (see table 1).

Table 1: Fish tagged in March 2016 in 3 locations around the Hin Nam No NPA

No	Fish Name	Latin Name	Location and Number			
			Laboy	Nong Ping	Vangkon	Total
	(Lao)					
1	Ka	Pristolepis fasciatus			5	5
2	Kod	Betta prima			5	5
3	Kabok	Cirrhinus molitorella		2	8	10
4	Sangeng	Mystus sp.			2	2
5	Dok Ngiu	Cyclocheilichthys armatus			25	25
6	Pok	Systemus orphoides			6	6
7	Langnam	Mystacoleus sp.	1	119	6	125
8	Namong	Toxotus sp.			6	6
9	E-thai	Osteochilus hasselti			5	5
10	Khaosay	Puntius falcifer		4	267	271
11	Nai	Cyprinus carpio			1	1
12	Chat	Poropuntius cf. laoensis	63	51		51
13	Sout	Hampala macrolepidota	3	1		1
14	Khabso	Raiamus guttatus		10		10
15	Khanglai	Crossocheilus siamensis		2		2
16	Khilam	Labiobarbus siamensis		8		8
17	Pak	Hypsibarbus lagleri		36		36
	Total		67	233	336	636

The highest number was tagged in Vangkon, where the river is narrow and fish are easy to catch. The lowest number was in Laboy. This a village where a FCZ is going to be established, fish are difficult to catch.

A lift net is used to capture all species in conservation zones in the month of March. At this time mature adults that are preparing to spawn are the main occupants of these zones. Captured individuals were held in a floating cage within the river channel. Fish was removed from the cage individually, weighed, measured for standard length, and placed in a tagging cradle.

Each fish was marked with a floy-tag that displays a visible and unique ID number, and the name of a household unit head. The tag was inserted behind the dorsal fin using a tagging gun. The ID number and tagging location were recorded, and the fish was returned to the location of capture. Time for tagging did not exceed 15 seconds per individual. Color-coded markers were located at regular distance intervals from the conservation zone to aid fishers in determining location of capture relative to protected area.

In addition to consultation with villagers, posters will be located near fishing areas to inform fishers and encourage them to participate in the study. A small reward of 10,000 kip will be given for return of tags. Village fishers will be instructed to note details about capture of marked individuals, including:

1. Tag ID number
2. Species (local name)
3. Type and size of fishing gear
4. Depth at which nets were set
5. Date and time
6. Location or distance from conservation zone
7. Habitat type
8. Presence of egg sack
9. Whether they kept or released the individual

Fishers will report sightings of tagged fish and return tags to the heads of household units who will hold tags until collection at regular intervals by project field staff. Data collection will continue for six month after tagging is completed.

4 Findings on Governance and Social Aspects of FCZ

4.1 People's satisfaction with FCZs

The finding for social implication is highly positive. We received 97% positive response from households observing that the fish production has increased around the FCZs and the surrounding areas.

All households (100%) said they agree with the concept of the FCZ and its rules. That indicates that dissemination and public participation were successful.

4.2 Understanding toward the regulation

Out of the 58 interviewed households, 50 (86%) showed good understanding toward the regulation for management of the FCZs. This is the outcome from various processes in establishing the FCZs by the project, which primarily concentrated on the public participation. Every rule and regulation was made by local people and it was approved in a General Village Meeting. The Regulations for Management of the FCZs were based on the discussion/consultation with the public sectors and the village elderly.

The remaining 8 households (14%) did not yet understand the essence and long term benefits from aquatic resources management. Some of them are afraid they may not be able to carry out fishing in the areas where they used to fish and that's why they are not ready to follow the rule or regulation. This is quite normal in the early phases of FCZ establishment. Usually such people tend to agree with the concept after seeing the positive results over a period of several years.

4.3 Enforcing the FCZ regulation

Three cases were reported of people offending against the FCZ regulations. After these people have been warned or educated by the FCZ committee together with village authorities in a special meeting, the same action has not been repeated. So this seems to confirm that the committees are quite capable to enforce their rules.

4.4 Community Involvement in the FCZs management activities

The FCZ regulations do not refer directly to local customs and culture. Anyhow, from the discussion with the elderly from Ban Tha Sa-at and Ban Nong Seng village, Boualapha district, they all said similarly that people of all ages regardless of their sexes and gender, are aware to contribute to the general activities of the villages; they are highly harmonized in joining the villages' activities; for instance, when having the meeting to welcome the village or district's quests or when organizing the village ritual ceremonies according to village customs and traditions or when the village organizes the religious festival, normally the men go to fishing and the women help to prepare cooking. Establishment of FCZs directly supports the tradition and belief which inhabits from the ancient time; in some villages, they used an existing sacred conservation zone as the FCZs or selected the site as the FCZ such as in Vangkhon village.

5 Findings on Ecological Aspects: Fish Conservation

5.1 Anecdotal evidence

Most of the interviewed households observed increases in fish stocks as a result of FCZ. However, it is hard to prove if preserving brood stocks in the dry season indeed leads to more spawning and increased fish stocks in the wet season. Sometimes fish leave the FCZs in the early of rainy season for reproduction and spawning and then these fish are caught first by the fishermen.

In Ban Nongseng and Nongping people said children spend one hour can catch one kilogram of small aquatic animals in one hour and six fishermen can catch 2 kg of fish (Pa Jat or *Poropuntius laoensis*) in one hour (see also pictures below).

The FCZ may also contribute to terrestrial biodiversity conservation. For example in Nong Ping and Vangkon villages, fresh footprints of otters (*Lutra* spp.) are regularly seen on the rocks near the FCZ. These endangered animals may be able to survive better due to the conservation of fish in the FCZ in the dry season.

5.2 Specific observations on two popular fish species

The fish which has increased the most is “Pa Jat” or (*Poropuntius laoensis*) and the second species increased is Pa Pak (*Hypsibarbus malcolmi*) both in Xebangfai river and Nam Ngo river. These fishes eat waterplants. If nobody enters the FCZ, water plants may grow better because they are less disturbed and fish may grow faster.

“Pa Pak” is one of the fish species which has been promoted to raising system in Laos about a decade ago. The consultants observed there is a good potential for breeding fingerlings of this species in fish ponds made from old bomb craters in Ban Vangkon. Many of these fish ponds have water all year round. The Hin Nam No National Protected Area (NPA) should be support the villager to set up small hatchery at Vangkon. Selling fingerlings could become a source of income for that village and the fingerlings can also be used to restock FCZs.

5.3 Comparing fish availability to surrounding areas

The people of these four villages in Boualapha district still enjoy the abundant aquatic resources. They can consume more than 20 kg of fish per person per year, compared only 17 kg per person per year in neighboring areas also fishing in the Xe Bang Fai river, e.g. Ngommalat and Mahaxay district (WWF data).

Secondly, the higher abundance of fish resulting from FCZ may reduce the time needed for fishing in the Boualapha villages, leaving them with more time for agriculture and for collecting Non-Timber Forest Products (NTFP). Respondents say they can now catch 2 kg of fish in 2 hours, before the FCZ it took them 4 hours to get less than 2 kg of fish.

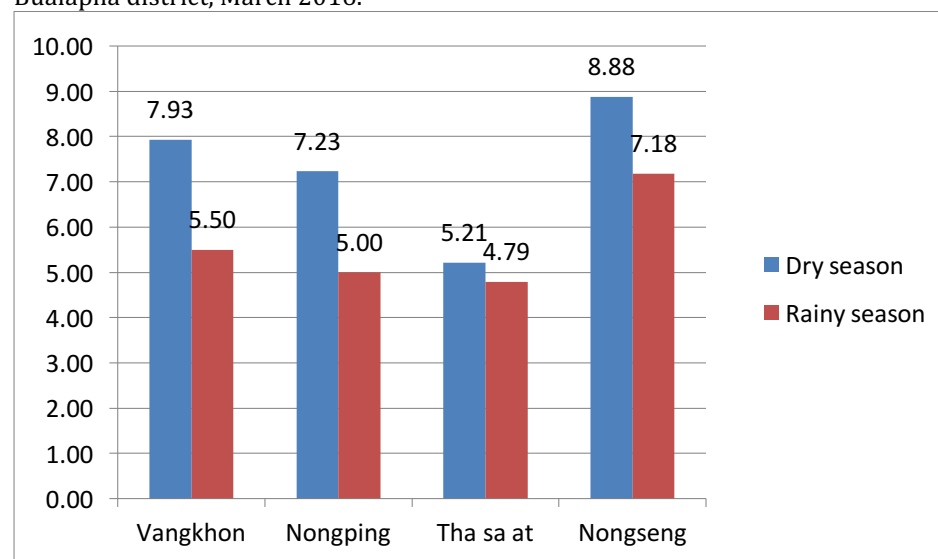
5.4 Differences in fish catches between Nam Ngo and Xe Bang Fai

From the interviews, some information could be deduced on fishing efforts: people in the villages along the Nam Ngo stream (Vangkon and Nong Seng) spend on average 3.6 hours fishing per day, compared to 3 hours per day in the villages along the Xe Bang Fai river (Nongping and Tha Sa-at).

This may be explained by the differences in fish availability: it is easier to catch fish in a small stream like the Nam Ngo then in a big river like the Xe Bang Fai. The Nam Ngo stream is quite narrow, it has sand build-ups. In the dry season, the stream dries up and fish survive in isolated deeper ponds separated by dry sandy stretches. The Xe Bang Fai river is much larger and deeper and has water all year round.

This difference is also reflected in data on fish catches. The villages along the Nam Ngo (Vangkon and Nong Seng) can catch more fish per household per month then those along the Xe Bang Fai (Nong Ping and Tha Sa-at) see graph 1 below. The graph also shows that more fish is caught in the dry season than in the wet season.

Graph 1: Differences in fish catches between the dry and wet season (kg fish caught per household per month) data from 58 households interviewed in 4 villages (Vangkhon, Nongping, Ta Sa-at and Nong Seng), Bualapha district, March 2016.



6 Findings on Economic Aspects: Nutrition and Income Benefits

6.1 Fish Consumption

Among the 58 households interviewed, on average 91% of all fish consumed is derived from waters in rivers around the FCZ, the remainder is bought. Hardly any fish is sold.

The average fish consumption per household was 106 kg per year. This is equivalent to an intake of 48 grams of fish per capita per day, which is 70% of the national average of 70 grams per capita per day (see table 2 below).

The average value of all fish caught per FCZ was 172 million kip (\$23,395) per year. The average value of fish caught from the FCZ per household per month is worth 201,042 kip per month, which is equivalent to 25% of baseline household income measured in 2012 (793,000 kip per household per month).

These figures underline the significance of fish as a primary source of protein in the diet and a key element of the household economy. As 91% of fish consumed is derived from waters around the FCZ, good governance of FCZ can help to preserve or even increase this important source of subsistence for rural households.

7 Key lessons learnt

- The FCZ contribute directly to the preservation of a vital source of food security for local communities: fish, their key source of protein. This survey showed that households living around FCZ can consume 48 gram/capita/day from wild resources. The average value of fish caught per FCZ per year amounts to 172 million kip (\$23,395). The value of fish from FCZ consumed amounts to 25% of household income.
- Besides the livelihood benefit, the FCZ may also provide biodiversity conservation benefits, in terms of number of fish and species diversity of fish.
- Most fishermen and women believe that FCZ improve fish catches and reduce fishing times
- People in all the four villages were fully supportive of the purpose of having FCZs. There is a very high chance that FCZ will continue to function well, even long after the original supporting project will be gone.
- All villagers expressed satisfaction with having the FCZs and that they would continue to manage them, and maintain the regulations regime, in the future. They understood the benefits of having the FCZs very clearly.
- The FCZ committees seem to be able to enforce the rules quite well. They will need continued support from village and district authorities protecting their rights to do so.
- The setting up and management of the fishery conservation zones in the villages is the most obvious activity promoting sustainable resource management around the Hin Nam No NPA.

Table 2: Summary of Fish Consumption Data from Household Interviews, March 2016. 58 Households were interviewed in four villages.

Code	Parameter	Unit	Formula	Villages				Overall
A	Village	Name		Ban Nongping	Ban Vangkhn	Ban Nongseng	Ban Thasaat	
B	No HH interviewed	No		13	14	17	14	58
C	Total no persons in interviewed households	No		93	84	94	78	349
D	Average no persons per household	No	=C/B	7.2	6.0	5.5	5.6	6.0
E	Fish caught around FCZ	kg/hh/yr		90	112	83	102	97
F	Fish bought from market	kg/hh/yr		10	10	9	10	10
G	All Fish Consumed per HH per year	kg/hh/m	=E+F	100	123	92	112	106
H	All Fish Consumed per HH per month	kg/hh/m	=G/12	8.327	10.208	7.701	9.351	8.845
I	Fish Consumed per Capita per month	kg/pp/m	=H/E	1.2	1.7	1.4	1.7	1.5
J	Fish Consumed per Capita per day	gram/pp/day	=G*1000/D/365	38.3	55.9	45.8	55.2	48.3
K	% from FCZ/river	%	=E/G	90%	92%	90%	91%	91%
L	% fish bought	%	=F/G	10%	8%	10%	9%	9%
M	Total No HH in the village	No		125	29	61	77	292
N	Fish Price	kip/kg	kip/kg	25,000	25,000	25,000	25,000	25,000
O	Value of fish obtained from FCZ	kip	=E*M*N	282,451,923	81,510,714	126,933,824	197,037,500	171,983,490
P	Value of all fish consumed	kip	=G*C*N	312,250,000	88,812,500	140,927,941	216,012,500	189,500,735
Q	Value total fish consumed in \$	\$	\$	\$ 38,549	\$ 10,965	\$ 17,399	\$ 26,668	\$ 23,395
R	Value of all fish consumed per HH/mornth	kip/month	=H*N	208,167	255,208	192,525	233,780	221,121
S	Value of fish from FCZ per HH per month	kip/month	=L*R	188,301	234,226	173,407	213,244	201,042
T	Value of fish per capita per month	kip/month	=I*N	29,099	42,535	34,818	41,960	36,748
U	Value of fish per capita per month in \$	\$	\$	\$ 3.59	\$ 5.25	\$ 4.30	\$ 5.18	\$ 4.54

8 Recommendations

8.1 Recommendations for FCZ committees

- 1) Try to increase the fish population in the FCZs, get more fish siblings to flee into the FCZs, e.g. by regular feeding of fish inside the FCZ
- 2) Build up the FCZ fund to build infrastructures like fish viewing hall or a place where visitors can feed fish in Tha Sa-at and Vang Khon
- 3) Maintain and improve the demarcation of the FCZ boundaries and dissemination of FCZ rules
- 4) Try to support some households to become producers of fish fingerlings, request help in this from district staff and projects
- 5) Develop the FCZs to be the tourism sites that generate more income, where people can come and see the fish and relax in a natural environment.
- 6) Expansion the FCZ at Ban Nong Ping, Tha saat and Nongseng to two zone such as: one zone is for total protection all year round, the other zone is also protected most of the year, but can be used for a village fishing day celebration

8.2 Recommendations for Hin Nam No NPA and the GIZ project

- 1) The GIZ project should be support the expansion the FCZ in 3 villages such Ban Nong Ping, Ban Tha Sa-aat and Ban Nong Seng to be two zones such as described above.
- 2) Vangkon village has potential for income generation from setting up a small hatchery and training villagers for fish spawning and local fish species culturing. The project should support a pilot trial to test this potential.
- 3) FCZ Committees could organize recurrent household surveys every year, and use data on fish consumption as an indicator for the success of their management. Some technical support from the Livelihoods Unit of Hin Nam No NPA may be needed.
- 4) Co-Management Committee in each village could be organize an annual evaluation meeting where such results are presented and the implementation of fish conservation zone rules could be evaluated.
- 5) Fish tags are expected to be returned over the remainder of 2016, and a short report on where they were found should be prepared by the Livelihoods Unit.
- 6) The project could consider to engage the consultants to tag more fish using the remaining 350 floy tags in some other location in the next dry season

9 Pictures



Photo 1: Group Photo training of FCZ members from three villages: Nong Seng, Vangkon and Nong Ping, with the consultants and members of the Livelihood Unit, 11 March 2016



Photo 2: Individual household interviews on fish catches and consumption



Photo 3: Typical use of the river adjacent to the Fish Conservation Zone: Children used the Sa Wing (Scoop Net) to catch small aquatic animals in Nong Ping,



Photo 4: small edible aquatic insects called “niaw”, price is twice as high as fish (50,000 kip/kg)



Photo 5: The fishermen used the gillnet to caught fish surrounding FCZ at Nong Ping, they could catch 2 kg of Pa Lat (*Poropuntius laoensis*) within 1 hour



Photo 6: Pa Lat (*Poropuntius laoensis*)



Photo 7: The women fishers using the Sa Wing (Scoop Net) in Nong Seng village, catching 6 species: Pa Bou (*Oxyeleotris marmorata*/Rhinogobius sp.), Koug (Shrimp), Pa Id (*Lepidocephalichthys* sp./*Nemacheilus* sp), Pa Phan (*Schistura kengtungensis*), Pa Xeow (*Rasbora* sp) and others aquatic insects..



Photo 8: Tagging fish with the Fishbio tagging tool



Photo 9: Recording tagged fish



Photo 10: Releasing Tagged Fish