Update:
Kootenai River Burbot Restoration Program

Kootenai Tribe of Idaho

Presentation to KVRI

November 19, 2012

Thanks to KVRI and all our partners for continued support of the burbot restoration program!

Memorandum of Understanding Concerning the Kootenai River/Kootenay Lake Burbot Conservation Strategy

Collective Participant Signature Page

The Undersigned agree to the Memorandum of Understanding Concerning the Kootenai River/Kootenay Lake Burbot Conservation Strategy

Gary Aitken, Sr.
Kootenai Valley Resource Initiative (KVRI) Co-Chair

Darrell Kerby
Kootenai Valley Resource Initiative (KVRI) Co-Chair

Dan Dinning
Kootenai Valley Resource Initiative (KVRI) Co-Chair

Stephen J. Wright
Administrator & Chief Executive Officer
Bonneville Power Administration (BPA)

Cam Matheson
Manager, Generator Operations
BC Hydro

Wayne L. Stetski
Regional Manager, Kootenays
British Columbia Ministry of Water, Land, and Air Protection (MWLAP)

Darrell Kerby
Mayor
City of Bonners Ferry, State of Idaho

Ronald R. Smith
Chairman, Boundary Co.Commissioners
Boundary County of the State of Idaho

Barry Rosenberger
Area Director of BC Interior
Department of Fisheries and Oceans of Canada (CDFO)

Charles E. Corsi
Regional Supervisor
Idaho Department of Fish and Game (IDFG)

James L. Caswell
Administrator
Idaho Office of Species Conservation (OSC)

Gary Aitken, Sr.
Tribal Chairman
Kootenai Tribe of Idaho (KTOI)

Chris Hunter
Chief of Fisheries
Montana Fish, Wildlife and Parks (MFWP)

William T. Grisoli
Brigadier General, USA
Division Engineer
U.S. Army Corps of Engineers (USACE)

David J. Wesley
Deputy Regional Director
U. S. Fish and Wildlife Service (USFWS)

Kathy D. Peter
Director, Idaho Science Water Center
United States Geological Survey (USGS)

February 2002 - KVRI agrees to form a Burbot Subcommittee to develop a conservation strategy

Historical interviews of community members provided important input

THE OFFICIAL NEWSPAPER OF BOUNDARY COUNTY, BONNERS FERRY, MOYIE SPR

BONNERS FERRY HERALD

THURSDAY, January 17, 2002

Crapo supports efforts for burbot alternatives

By KATHY NUSSBERGER
Staff writer

Representatives of the city, county, Idaho Conservation League (ICL) and the Kootenai Tribe met with Idaho Senator Mike Crapo Tuesday to discuss alternatives to listing the burbot as endangered.

"Once we reach a point of implementation we will need funding, and I think we will be very instrumental in helping with this issue," said Crapo. "We may also be able to help with the research study, which might require other funding sources."

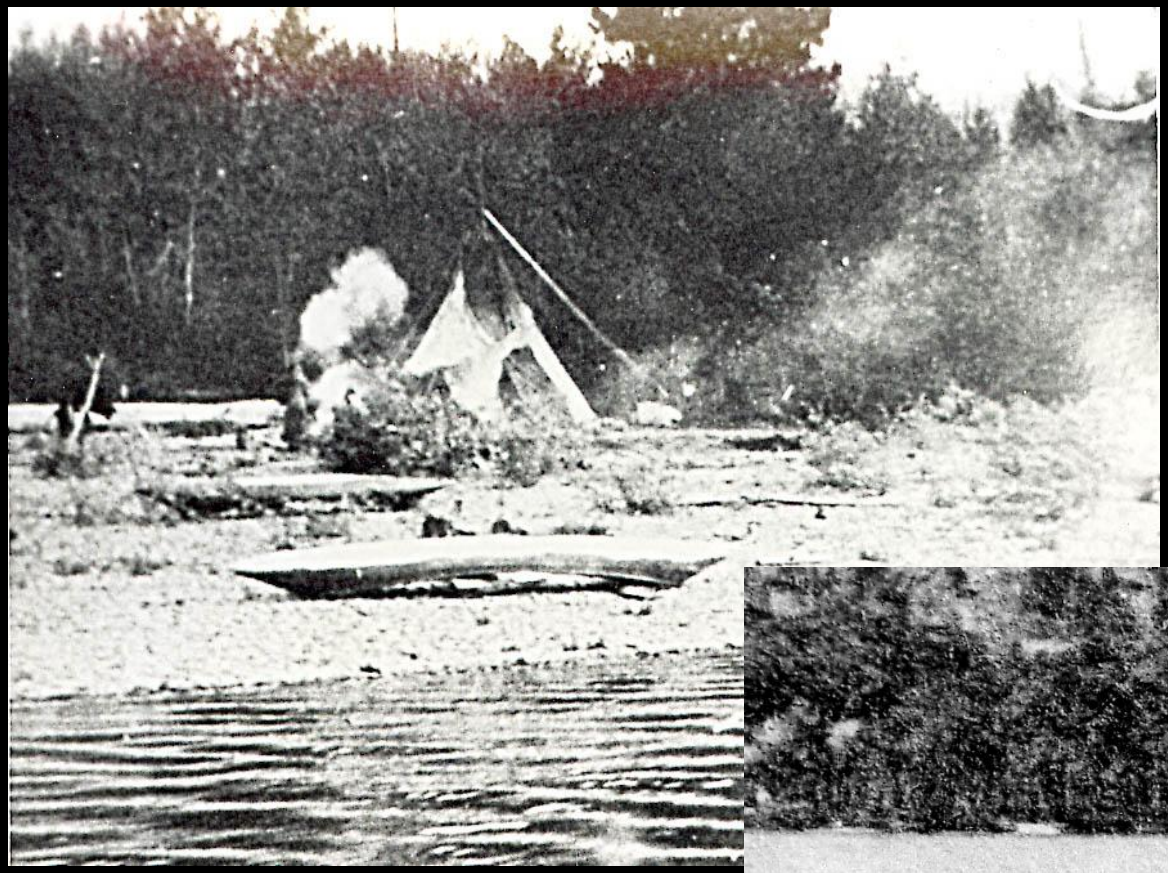
Project coordinator of the Kootenai Tribe Patty Perry said that help from Sen. Crapo's level of government would be needed, and Crapo confirmed that he wanted to help.

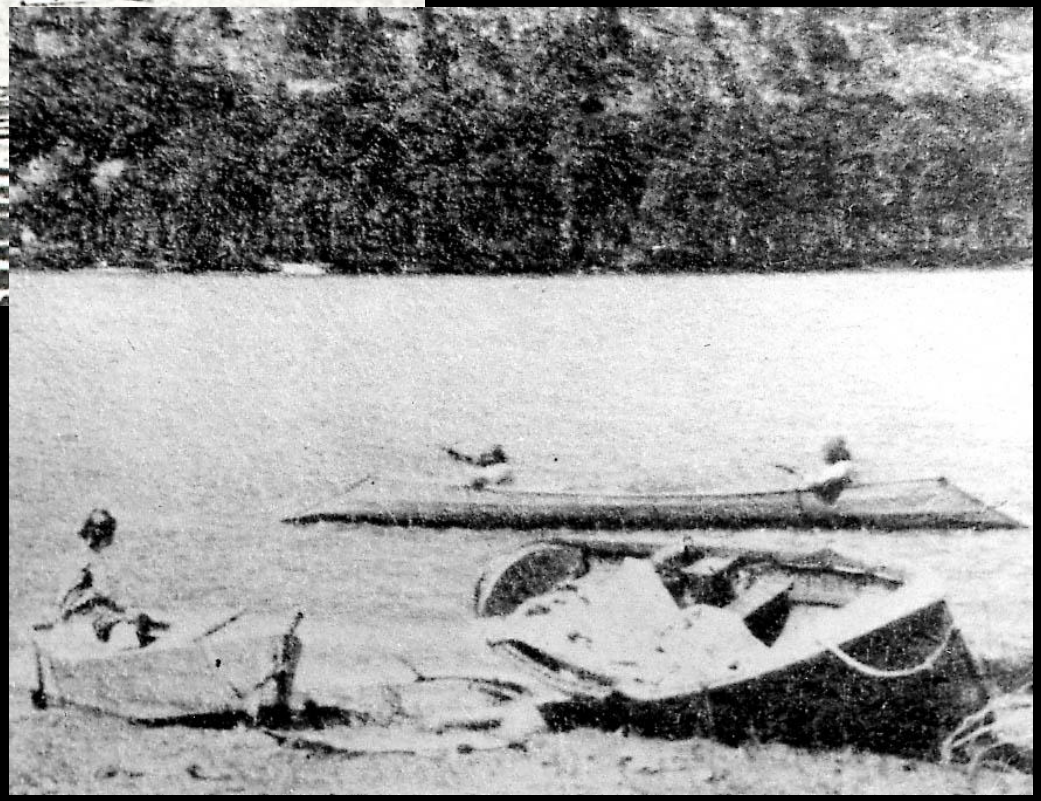
"We have several important species and believe that one by one they are becoming listed," said Sue Ireland, director of the Tribal Hatchery. "We are proposing a new approach that involves community input rather than governmental agencies working solo."

Ireland stressed that everyone involved wants to fulfill the U.S. Fish and Wildlife Service mandates for

See Crapo, A-8

Senator Crapo visited the Kootenai Tribal Hatchery Tuesday and participated in helping staff to tag a baby sturgeon as his wife looked on.





British Columbia Ministry of Environment

IDFG documents population decline –

By 2003 the Lower Kootenai population is estimated to be <50 fish

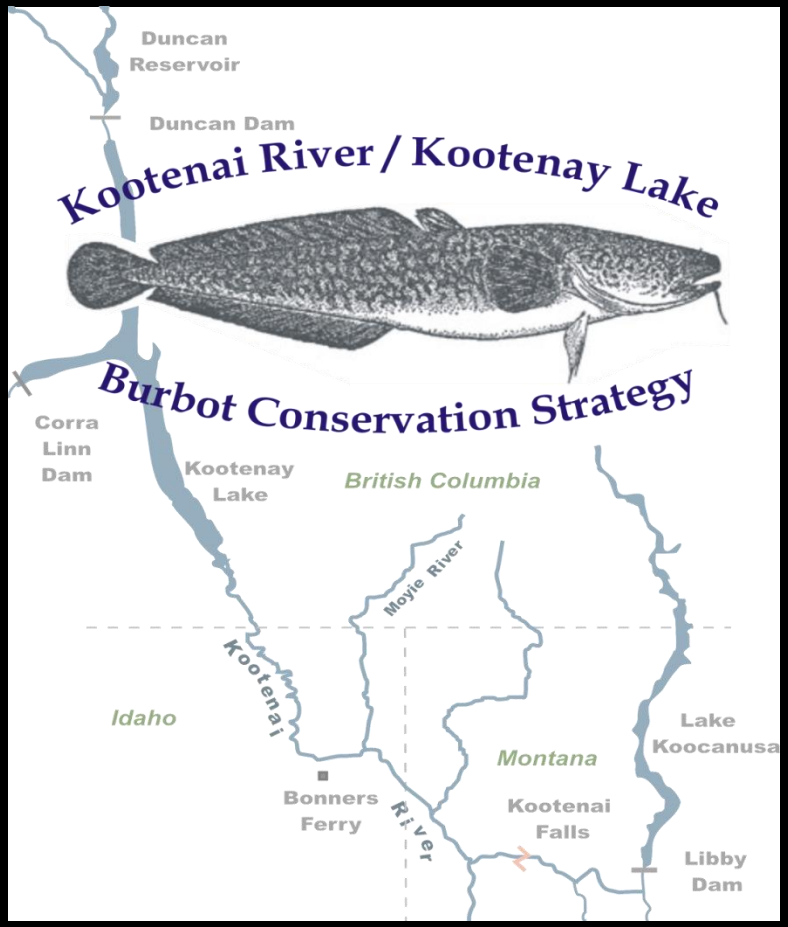
Threats to the Burbot Population

- **Low Population Size**
- **Winter Flow Management**
- **Winter Water Temperatures**
- **Reduced Productivity**
- **Habitat Changes**

The KR burbot was proposed for emergency listing by conservation groups in February 2000

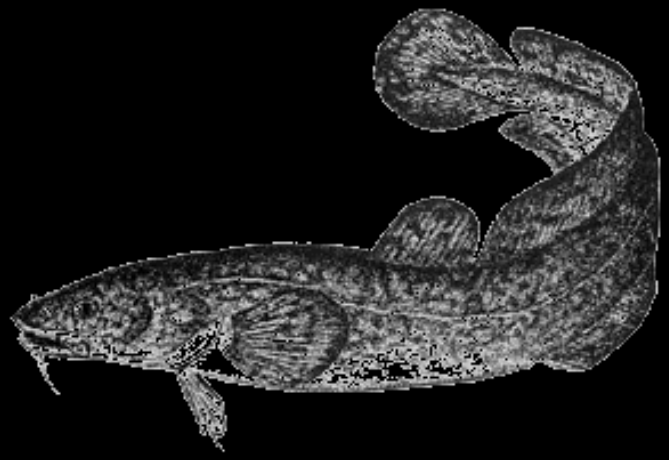
Burbot Restoration

Goal: Restore a viable and self-sustaining harvestable burbot population in the Lower Kootenai River.



Burbot Conservation Strategy

- Conservation Aquaculture
- Monitoring and Evaluation
- Alternative Hydro-operations Plan
- Habitat Restoration
- Education and Outreach



Burbot Program - 2012

Donor Stock – Moyie Lake

Results - Aquaculture

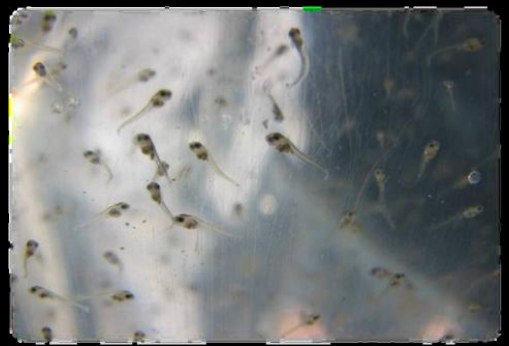
UI has developed techniques for large-scale production.

- Larval survival has been increased from 2% to 20-25%, allowing for increased larval and juvenile releases.
- Current capacity at UI has been fully utilized, leading to realization that a new facility of proper scale will be necessary to raise the number of burbot necessary for restoration.

Releases

Life Stage	2009	2010	2011	2012	Totals
Larvae	-	-	49,000	265,000	314,000
Juveniles	-	1,576	21,133	16,000	38,709
1 year	179	551	90	653	1,473
2 year	23	18	62	82	185
3 year	7	5	-	-	12
Totals	209	2,150	70,285	281,735	354,379

****** In-river larval and juvenile survival is currently unknown ******
****** Annual juvenile survival is currently assumed = 25% ******



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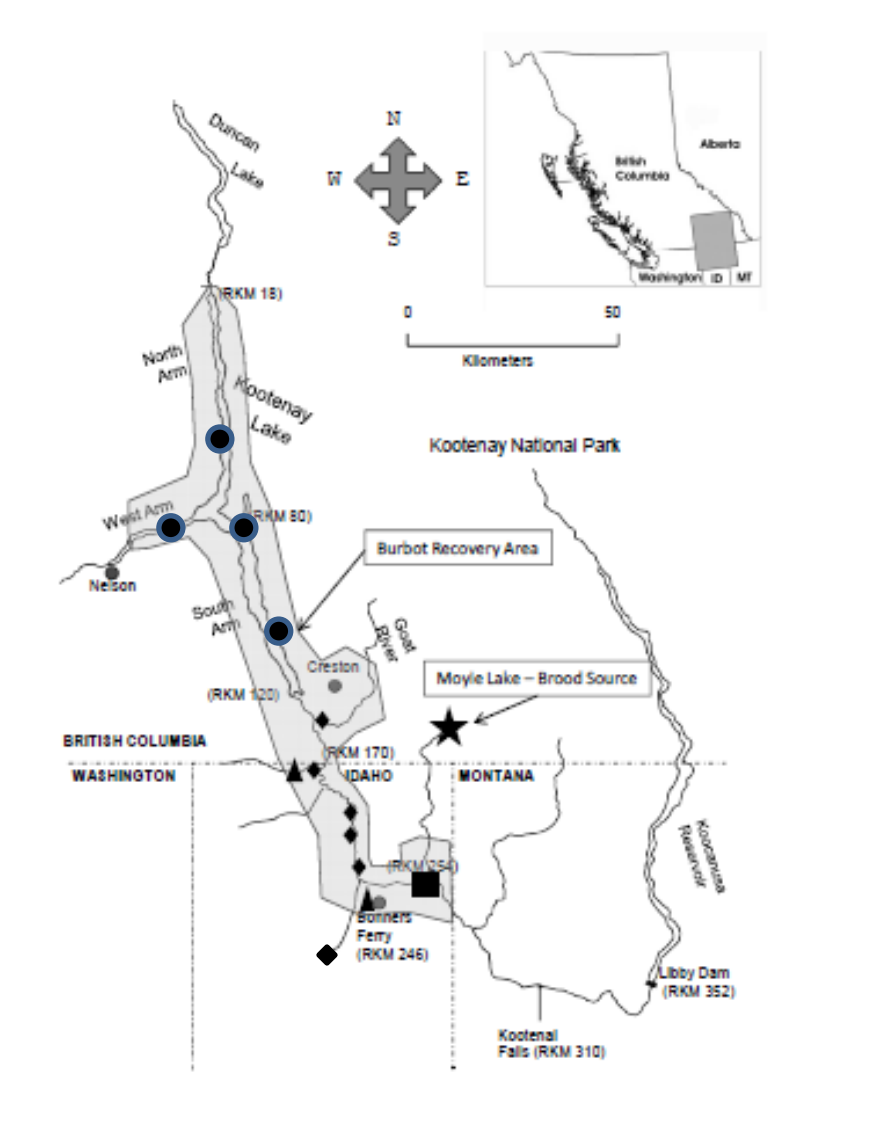
Juvenile burbot IMG_0821.MOV

Release Sites



Results - Recaptures

2012: (5) juveniles captured by UI in braided reach.

(3) 2011's ID'ed on PIT-tag array up Deep Creek.

2011-12: IDFG winter sampling captures increased.

Results - Telemetry

Ages 1 - 3 Annual survival = 54% (all pooled 46/85)

- 26 died within 30 days post-release
- 13 died 31- 365 days post-release
- Exclude post-release morts; Survival = 78% (46/59) ****

Age-1 Annual survival = 67% (10/15; Goat River only)

- 3 died within 30 days post-release
- 2 died 31- 365 days post-release
- Exclude post-release morts; Survival = 83% (10/12) ****

Age 2 & 3 Annual Survival = 51% (36/70 all release locations)

- 23 died within 30 days post-release
- 11 died 31- 365 days post-release
- Exclude post-release morts; Survival = 77% (36/47) ****

**** more indicative of wild fish survival ???

Results - Telemetry

- Hatchery burbot are dispersing throughout system:
- Dispersal up to 235 km reach of Lower river/lake, extending from the Moyie River in Idaho downstream to the Lardeau River Delta in the North Arm of Kootenay Lake.
- Mean dispersal of all released burbot was 50.5 km (31 miles).
- The dispersal differed across release locations, and included both upstream and downstream movements within the six month dispersal period.
- Of all burbot included in the dispersal calculations, 21/72 (29%) entered Kootenay Lake at some point, nine of which made it all the way to Lardeau Delta; over 100 km north to south distance across the lake.

Results - Tagging

Artificial Tags:

PIT-tag retention of > 10 g juveniles is very good.

Genetic Based Tag:

UI and IDFG have developed a genetic marker that has 97% accuracy for determining hatchery origin by using parental lineages.

Conclusions

To date (2009 – 2012):

- ✓ UI has developed techniques for large-scale production.

- ✓ 1,670 1-3+ year-old sub-adults released
- ✓ 39,000 6-month-old juveniles released

- ✓ Ages 1- 3, annual survival > 50%
- ✓ Hatchery burbot are dispersing throughout system.

- ✓ PIT-Tags are highly reliable.
- ✓ Genetic based tagging is reliable to determine hatchery / wild origin.

Estimated Survival from 2009 Releases

Age	2009	2010	2011	2012	2013
0+	-	-	-	-	-
1+	179	-	-	-	-
2+	23	120	-	-	-
3+	7	16	80	-	-
4+	-	5	11	55	-
5+	-	-	3	8	36
6+	-	-	-	1	6
7+	-	-	-	-	1

Current Age Structure from 2009 - 2012 Releases

Age	2012
0+	16,000
1+	5,936
2+	408
3+	282
4+	63
5+	9
6+	1
7+	0

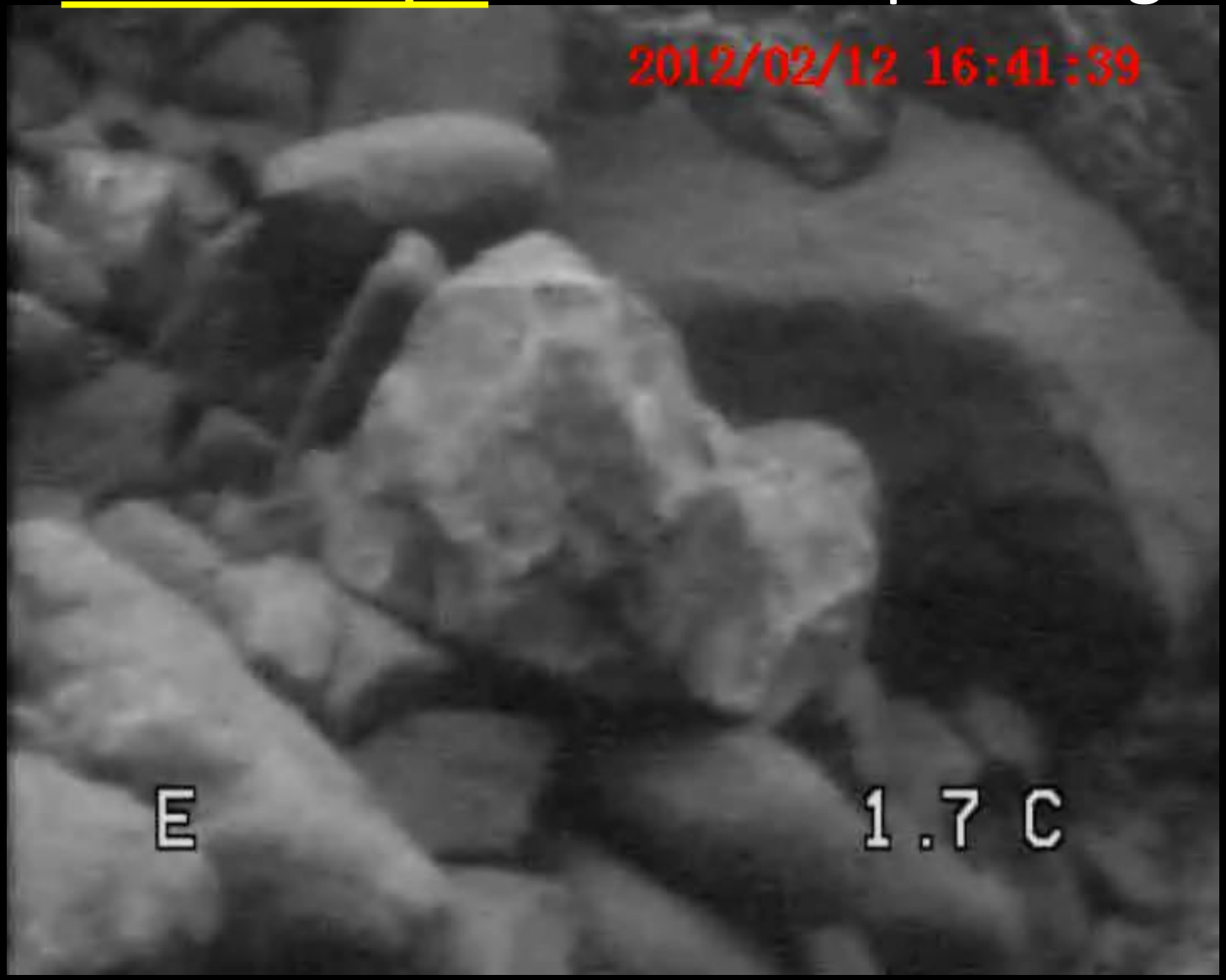
****** Estimate does not include larval contribution ******

Projected Age Structure from 2009 - 2012 Releases

Age	2012	2013
0+	16,000	-
1+	5,936	4,000
2+	408	3,940
3+	282	275
4+	63	187
5+	9	42
6+	1	7
7+	0	1

****** Estimate does not include larval contribution ******

Next Steps: Monitor Spawning



Start @ 5:00 for spawning event

Next Steps: Current Research

- Complete Age-1 burbot telemetry study (BC & IDFG).
- Complete tributary use study (IDFG).
- Continue winter sampling (IDFG & BC).
- Complete burbot sampling (gear & efficiency) study (UI & IDFG).
- Diet studies at UI-ARI.

**** All projects are in collaboration with KTOI ****

Monitoring & Evaluation Plan

The M&E Plan developed by KTOI follows several articles listed in Section 8.0 - Conservation and Restoration Strategies of the KVRI BCS.

"Employ conservation *aquaculture* methods as a key near-term component for burbot protection and restoration."

"Maintain a strong adaptive management scientific *monitoring and evaluation* program to guide implementation of population conservation and recovery activities."

"Implement an aggressive adaptive program of *experimental recovery measures*."

Monitoring & Evaluation Plan

	Outcomes	Phase 1 2004-2008	Phase 2 2009-2013	Phase 3 2014-2018	Phase 4 2019 - Beyond
Hatchery	Average egg take	Feasibility	(353,000 – 4,500,000)	6 million	6 million
	Average larval release	Feasibility	(12,355 – 350,000)	TBD	TBD
	Average 6-mo. juvenile release	Feasibility	(247 – 20,183)	20,000 – 100,000	Up to 125,000
	Average Age-1+ release	Feasibility	50 - 100	TBD	TBD
In-river	Average annual ages 1-3 abundance	Feasibility	6,000 (starting 2012)	32,000	63,000
	Average annual mature adults Ages 4 - 10+	Feasibility	~200	~8,000	17,500
Harvest	Idaho	None	None	None	TBD
	British Columbia	None	None	None	TBD

Table 2-2. *Past, current, and expected outcomes* **for each phase of the KRNFCAP – Burbot Conservation Aquaculture Program. Future estimates are based upon Age-0 6-mo. juvenile releases and no contribution from natural recruitment.**

Monitoring & Evaluation Plan

	Parameter Name	Phase 1 2004-2008	Phase 2 2009-2013	Phase 3 2014-2018	Phase 4 2019 +
Donor	Broodstock Donor Source	variable	Moyie Lake	Moyie Lake	Moyie Lake and/or Kootenai R.
	Broodstock % survival (field)	90	90	90	90
Hatchery	Broodstock % survival (in hatchery)	50 - 100	50 - 100	80 - 100	80 - 100
	No. of broodstock (Females:Males)	variable	9 – 20: 18 - 40	30 : 60	30 : 60
	No. of families (1 female:2 male = 2 families)	variable	18 - 36	60	60
	Fertilized eggs (Mean fecundity = 200,000 eggs / kg body weight)	variable	3.0 – 5.0 million	6 million	6 million
	% hatch	variable	50 - 70	60	60
	% Larval survival	variable	20 (2012)	20	20
	% Fry survival	variable	25	25	25
	% Age-1 survival in hatchery	variable	50 – 90	70	70
Natural (in-river)	% Egg to 6 months survival	-	unknown	unknown	unknown
	% Age-6 mo. to Age 1 (assumed)	-	20 - 35	20 - 35	20 - 35
	% Age-1+ survival in wild	-	40 - 70	40 - 70	40 - 70
	% Ages 2 – 10+ annual survival	-	40 - 70	40 - 70	40 - 70
	Min. # of adults	-	-	2,500	17,500
	# of spawning areas	-	-	≥ 3	≥ 3
	# of spawners per spawning area	-	-	TBD	TBD
	Natural Mortality (%)	-	30 - 60	30 - 60	20 - 50
Harvest	Fishing Mortality (%)	-	0	0	TBD

Table 5.1. Initial key assumptions for hatchery-reared and natural-origin components of a restored burbot population.

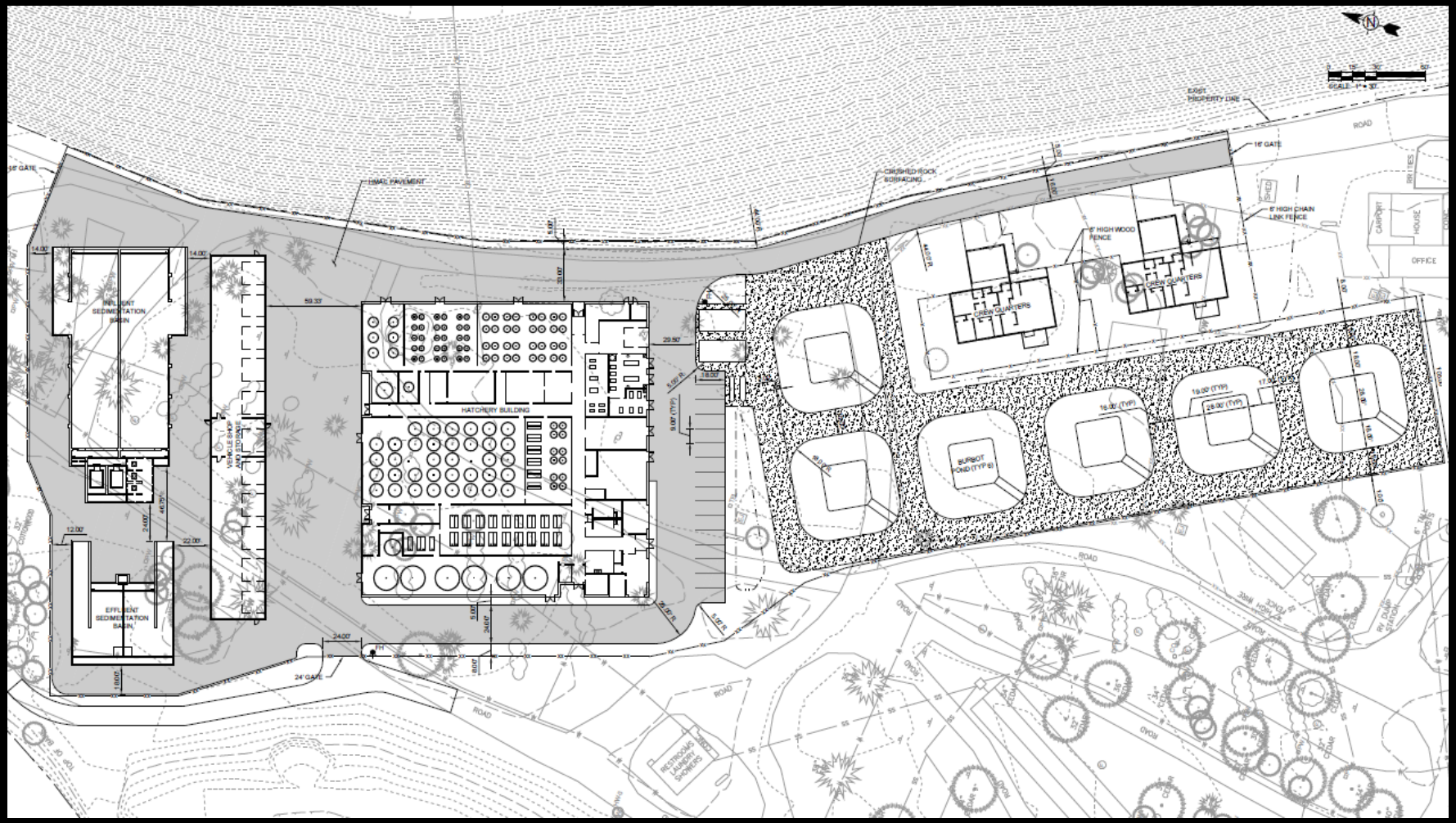
Monitoring & Evaluation Plan

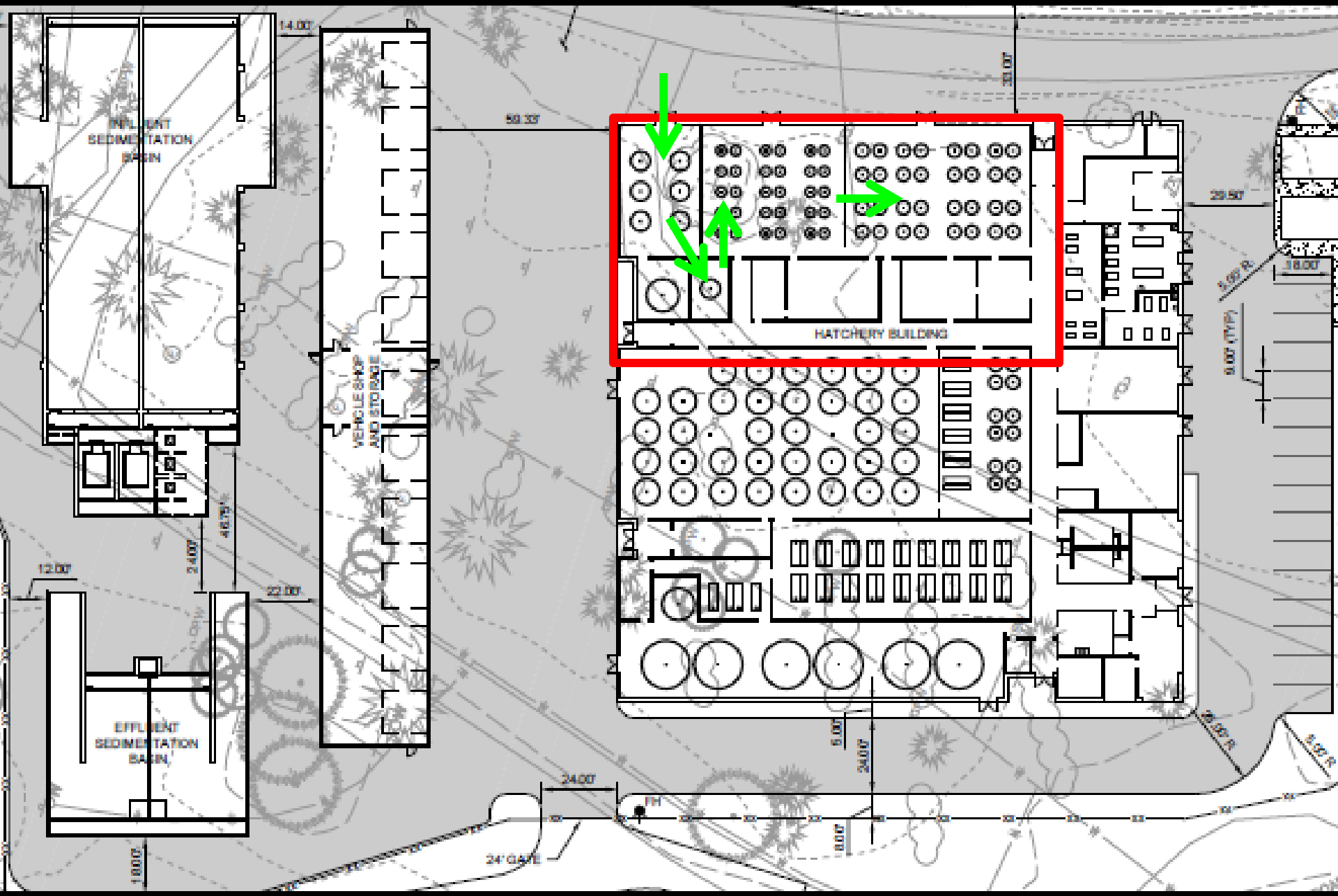
Annual Program Review (APR):

- 1st APR scheduled January, 17, 2013

Next Steps: Hatchery Program Expansion

Twin Rivers Hatchery

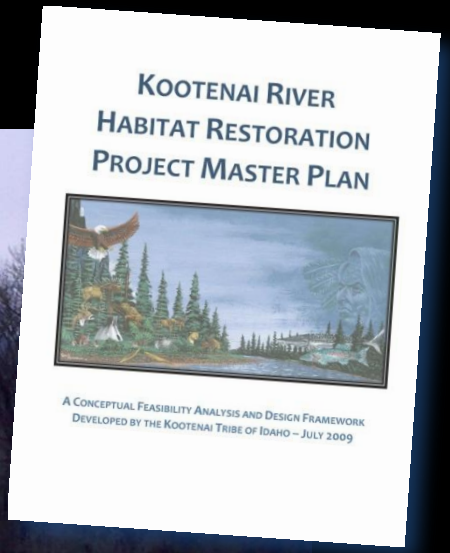


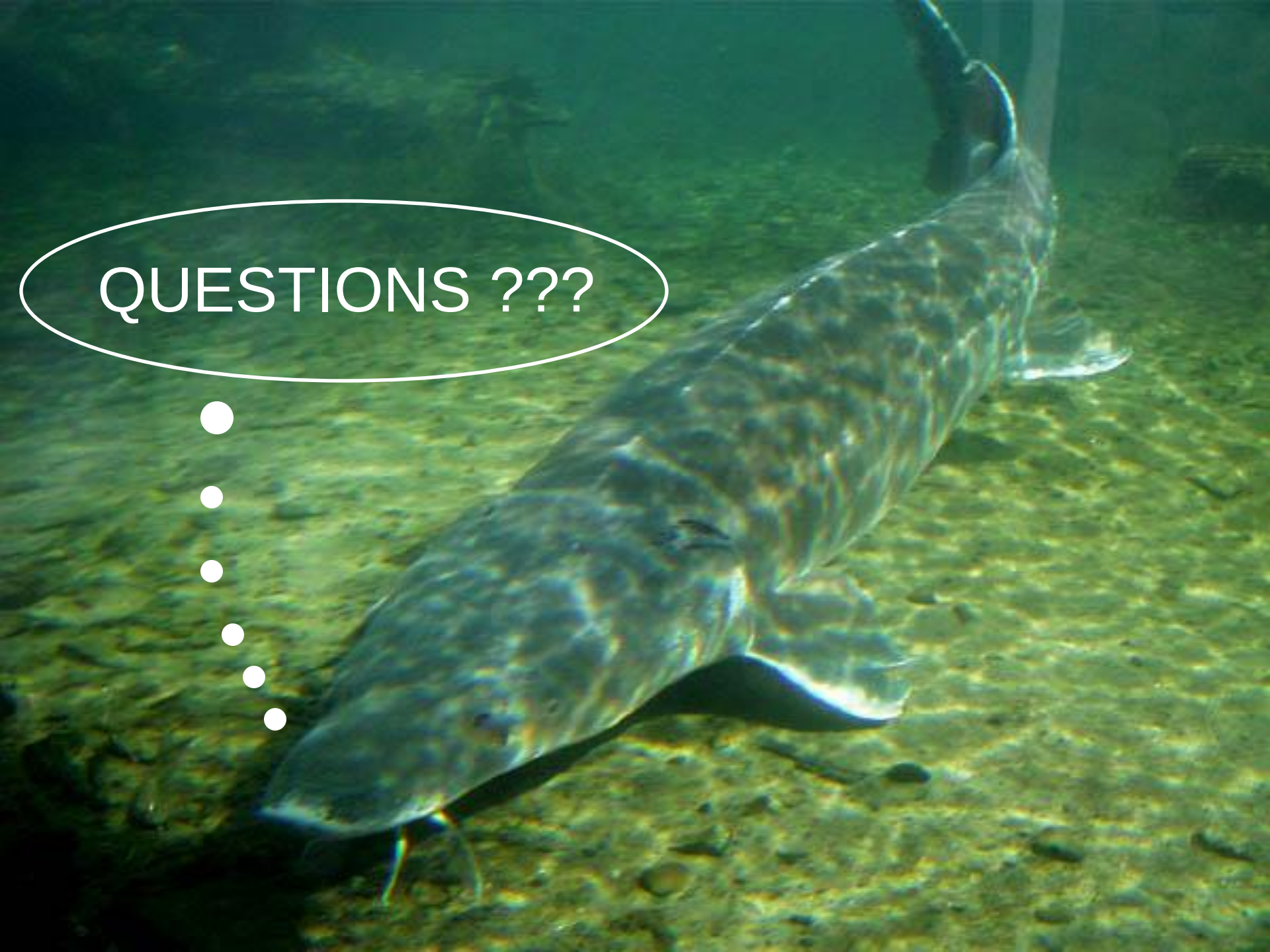

INFLUENT SEDIMENTATION BASIN
VEHICLE SHOP AND STORAGE
HATCHERY BUILDING
EFFLUENT SEDIMENTATION BASIN
14.00'
59.33'
33.00'
29.50'
18.00'
5.00' R.
9.00' (TYP)
48.75'
24.00'
12.00'
22.00'
5.00'
24.00'
18.00'
24' GATE
FH

Kokanee video

Next Steps: Habitat Restoration Program

- Series of targeted restorations to support the different life stages and hopefully assist in restoring natural reproduction and recruitment.




QUESTIONS ???