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Session E6: Monitoring Strategy of Sturgeon Behaviour to Ensure Functionality of Future Fish Passes: The Iron Gate II Case in the Danube River

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Presenter Information

Radu Suciu, Mirjana Lenhardt, Finn Økland, Iulian Nichersu, Dalia Onara, Stefan Hont, Marian Paraschiv, Daniela Holostenco, Cristian Trifanov, and Marian Iani

Monitoring strategy of sturgeon behaviour to ensure functionality of future fish passes: the Iron Gate II case in the Danube River



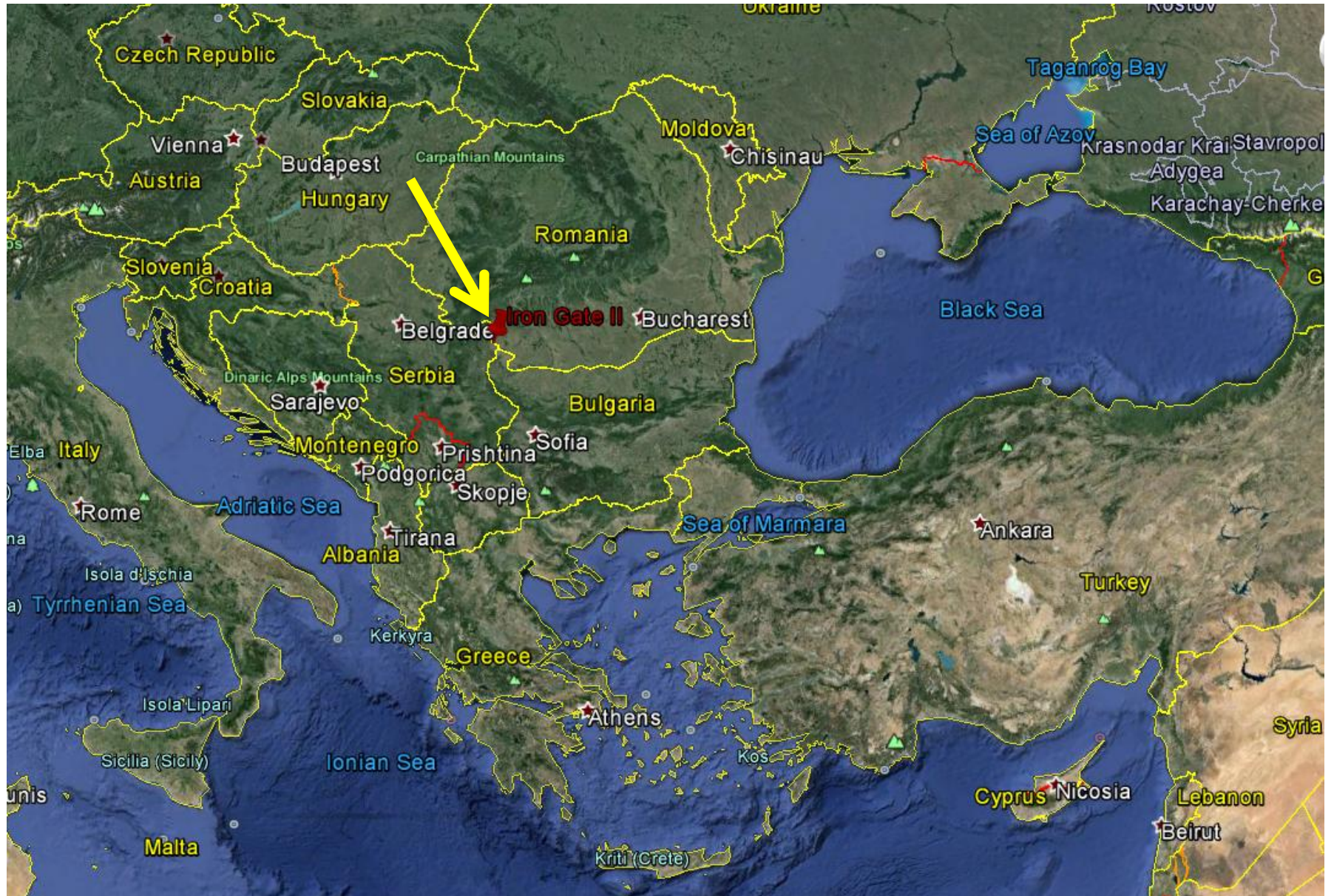
Radu Suci¹, Mirjana Lenhardt²,
Finn Økland³, Iulian Nichersu¹,
Dalia Onara¹, Stefan Hont¹,
Marian Paraschiv¹, Daniela Holostenco¹,
Cristian Trifanov¹, Marian Iani¹

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³ NINA - Trondheim, Norway

Location



HPP Gogoşu

23 AUG 2005
2:00am

Location

Mihajlovac

Romania

Serbia

HPP - Iron Gate / Djerdap II

© 2007 Tele Atlas
Image © 2008 TerraMetrics
© 2007 Europa Technologies

USGS

Google

4.89 km

Objectives:

- To conduct on site 3D bathymetry survey and ADCP velocity profiles
- Choose and adopt low stress inducing handling methods for tagging sturgeons
- To test bio-telemetry methods and equipment to achieve required resolution for locating sturgeons d/s Iron Gate II dams
- To choose molecular biology method to describe genetic diversity of tracked sturgeons
- To work out strategy for monitoring sturgeon behavior to ensure functionality of future up - and down stream fish passages



Materials and Methods

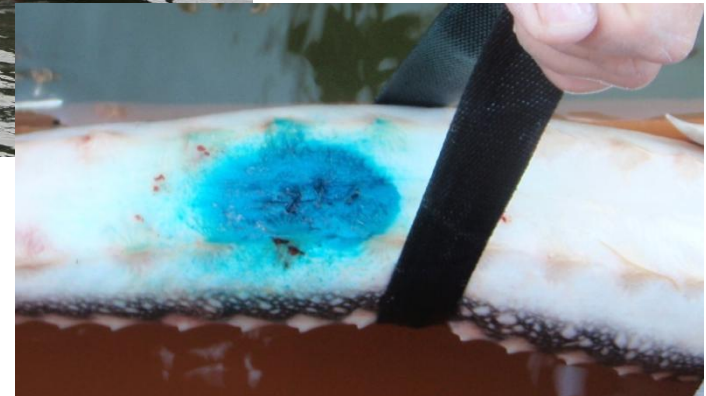
1. Fish handling in the nets to avoid lifting it of the water



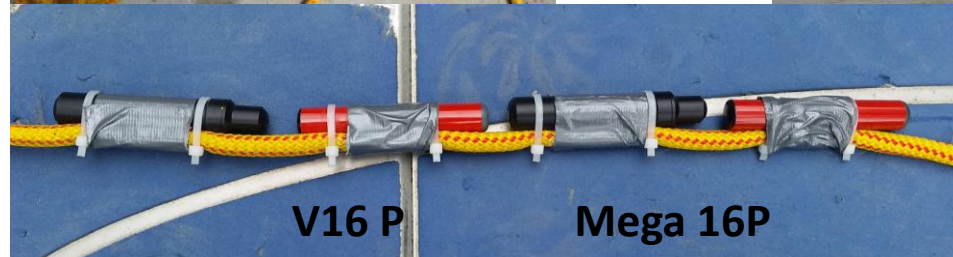
Side electro-narcosis (2013)



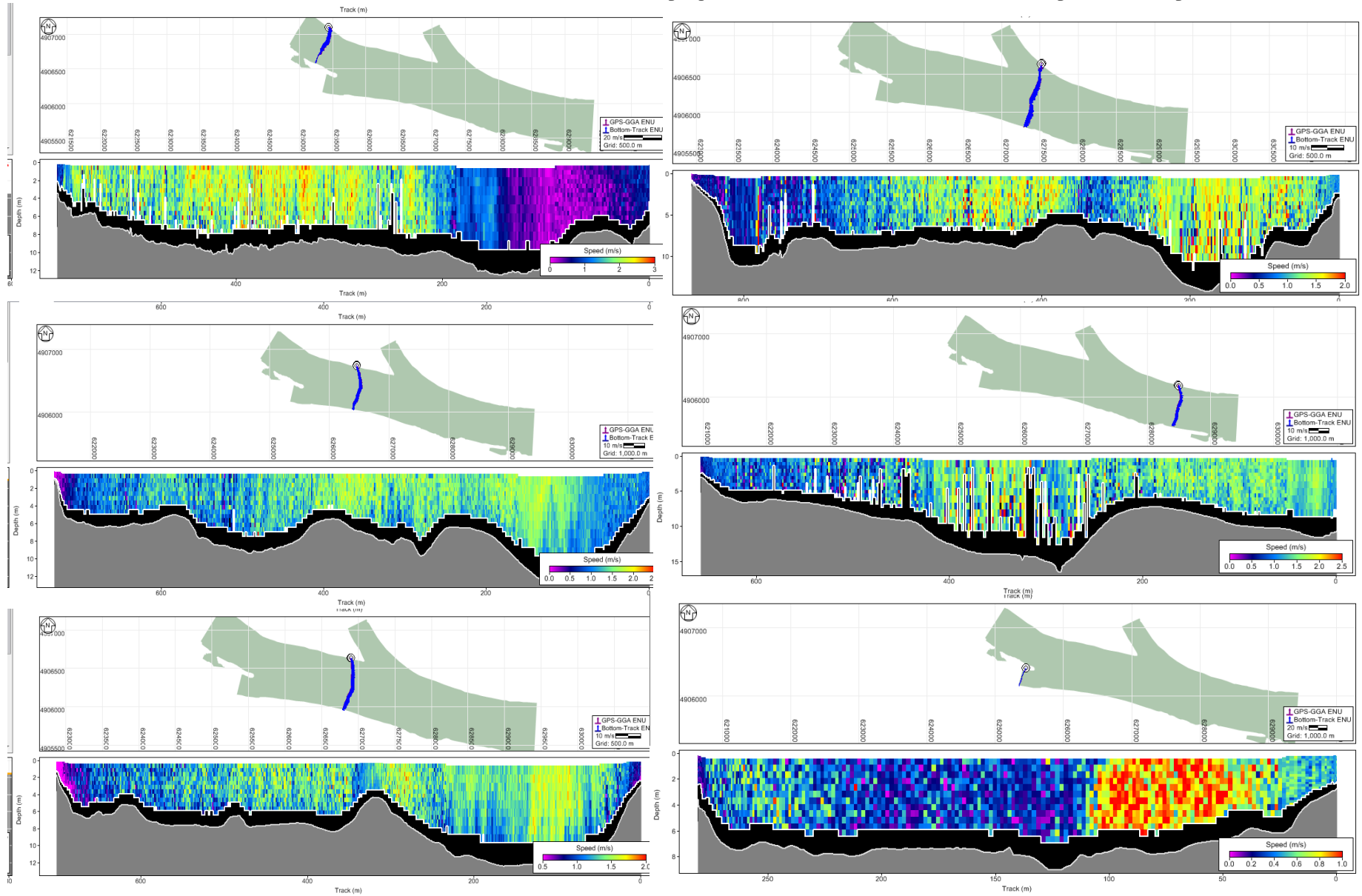
2. Electro-narcosis tube for surgical implanting of acoustic transmitters (2009)



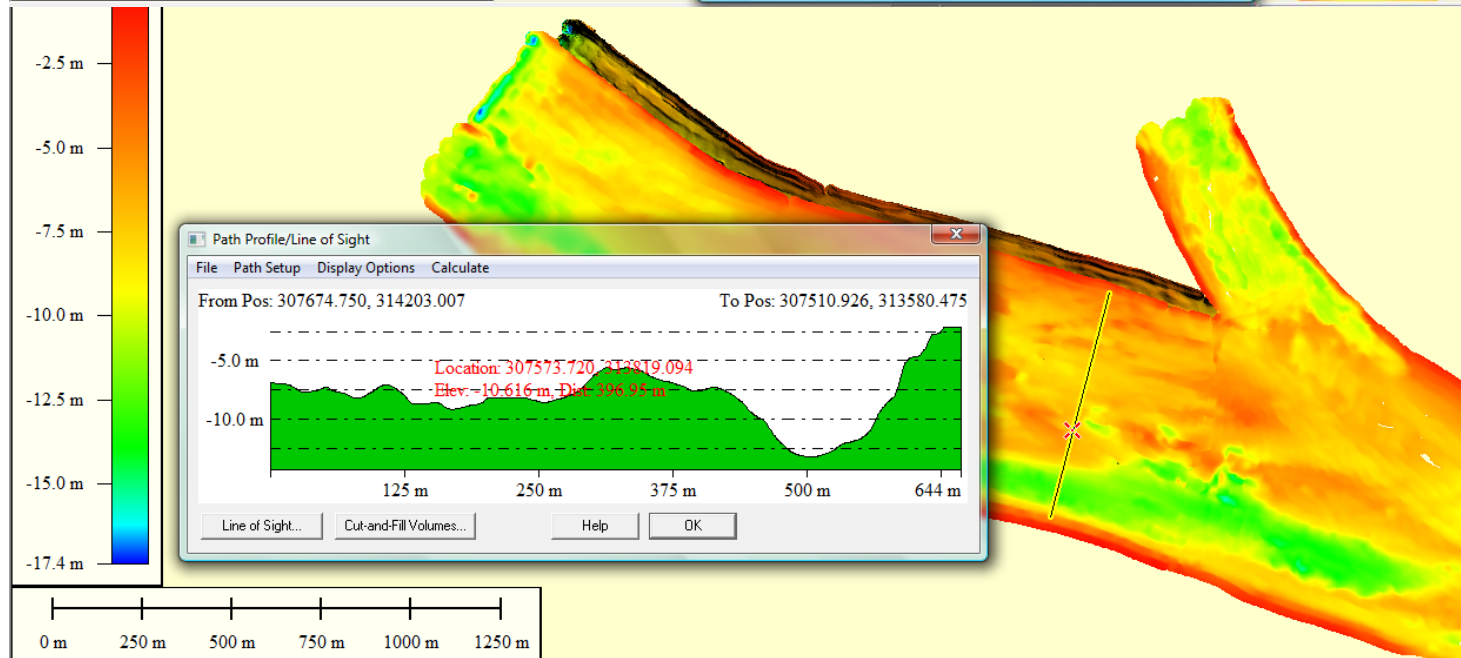
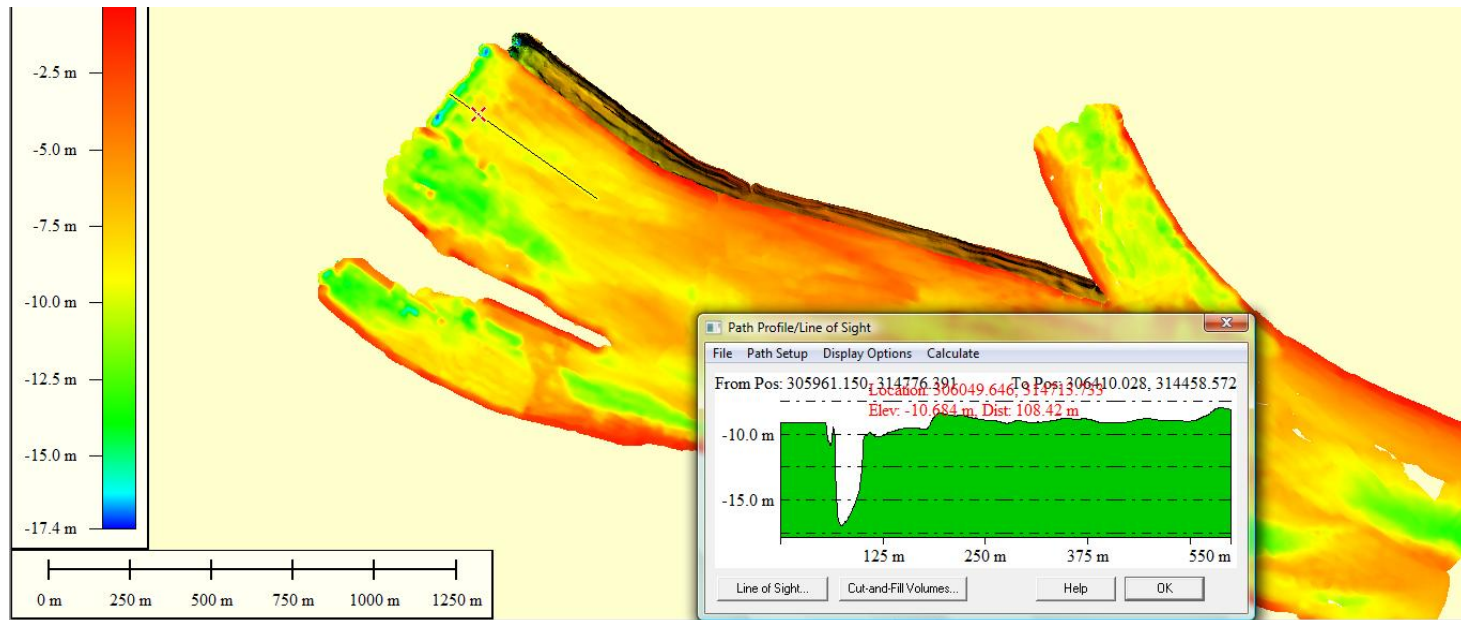
Testing detection range of Vemco vs Thelma acoustic transmitters and receivers



Results: 1. ADCP velocity profiles & 3D bathymetry

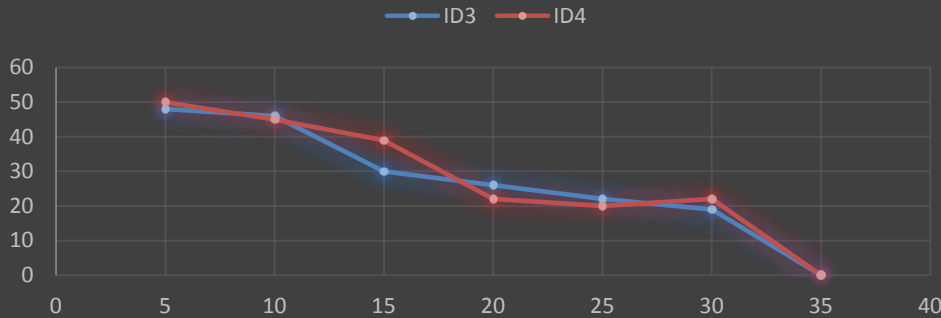


2. Multibeam 3D bathymetry

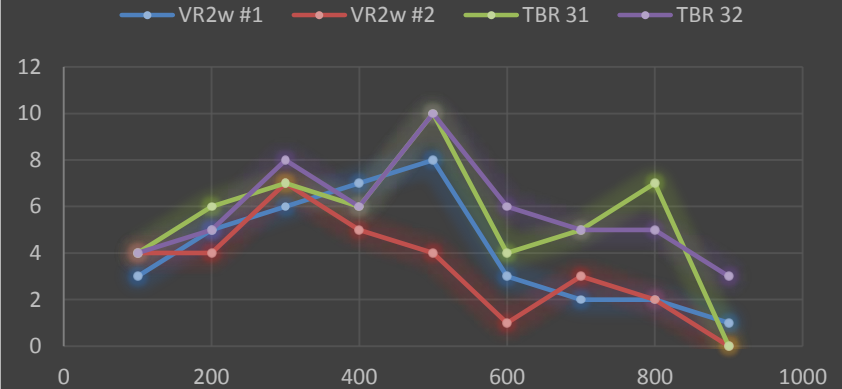


3. Testing detection range of Vemco vs. Thelma acoustic equipment

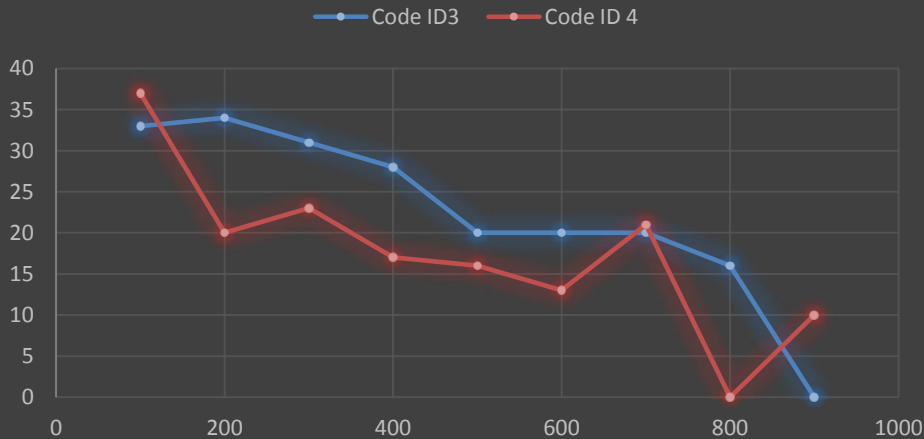
Range test number 1. Signal strength (dB) on TBR - 700. Thelma tag ID 3 & 4



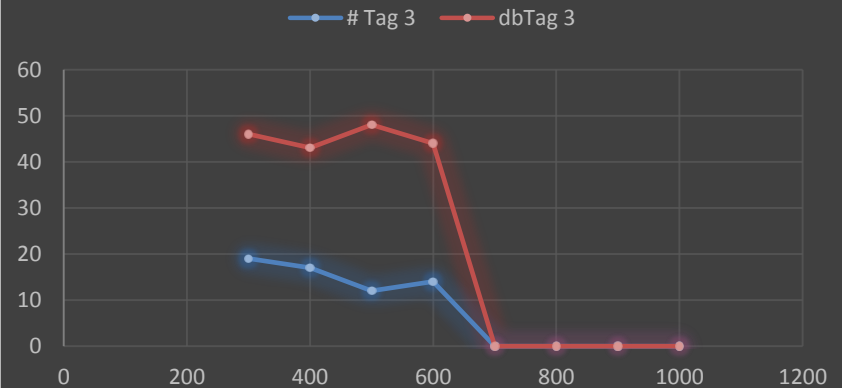
Range test number 2: # detections of Thelma Tag ID 3 / 15 min



Range test number2. Signal strength (dB) on TBR - 700



Range test number 3. Signal strength (dB) and number of detections on TBR - 700

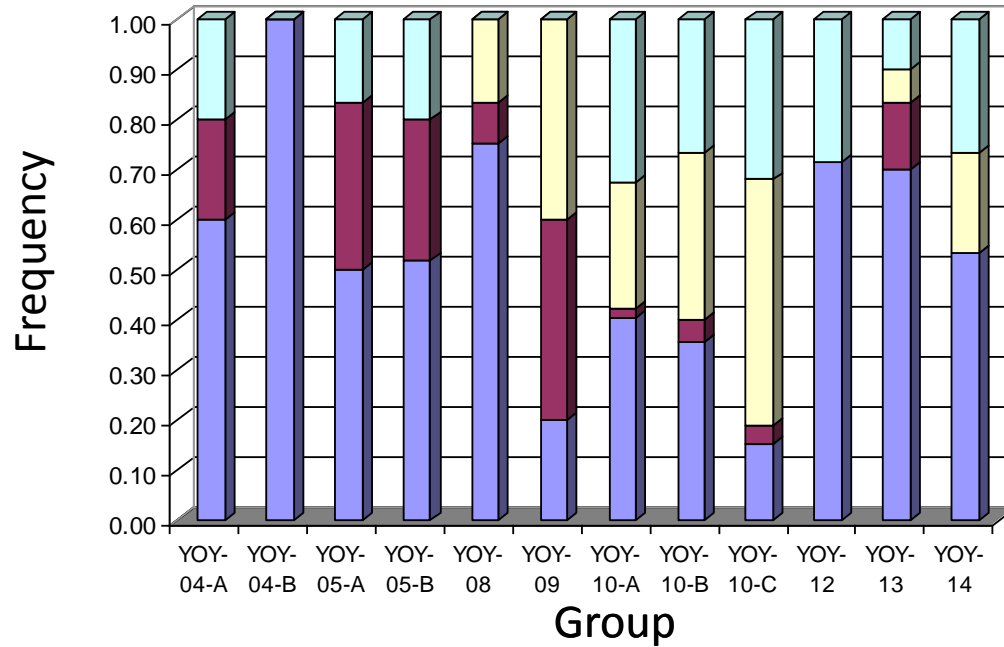


4. Testing detection range of ATS 3 stage radio transmitters

- Receiver SRX_600 from Lotec Inc. Canada, covering the frequency range from 142 to 143 MHz
- 4 element Yagi antenna + 2 m long coax (RG58) cable
- 12 mm rope with the whip antennas in a horizontal position at 0.5 m up from the bottom at water depth of 11.5 m
- Due to extremely high radio noise signals from radio tags could not be recorded at all

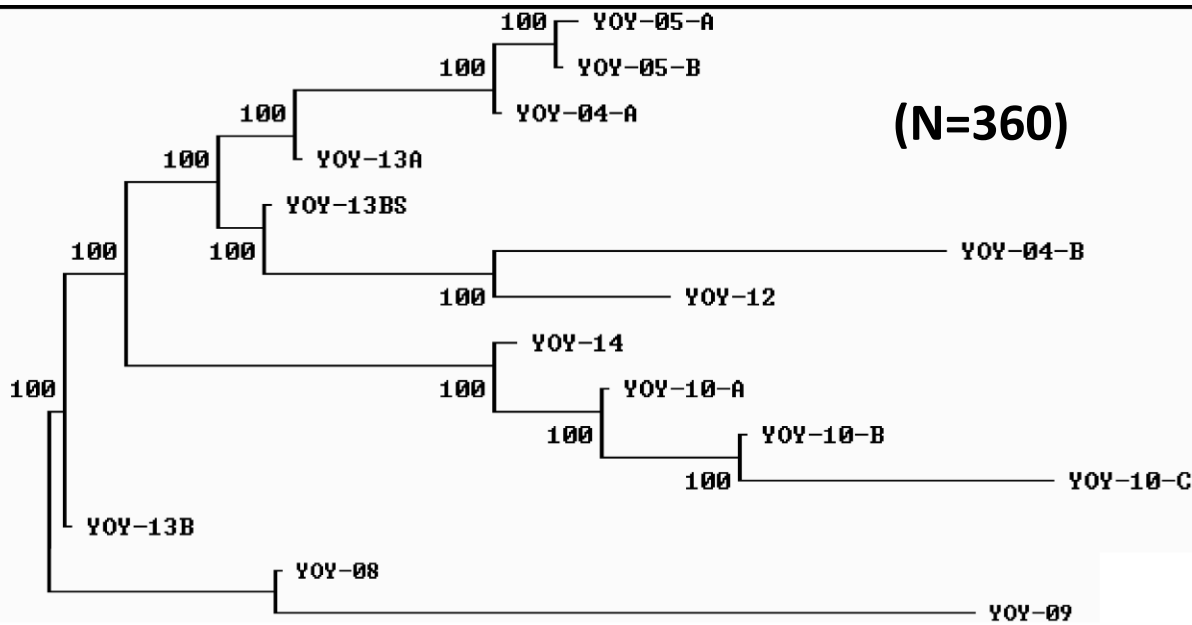


5. Screening genetic diversity of sturgeons at Iron Gate dams



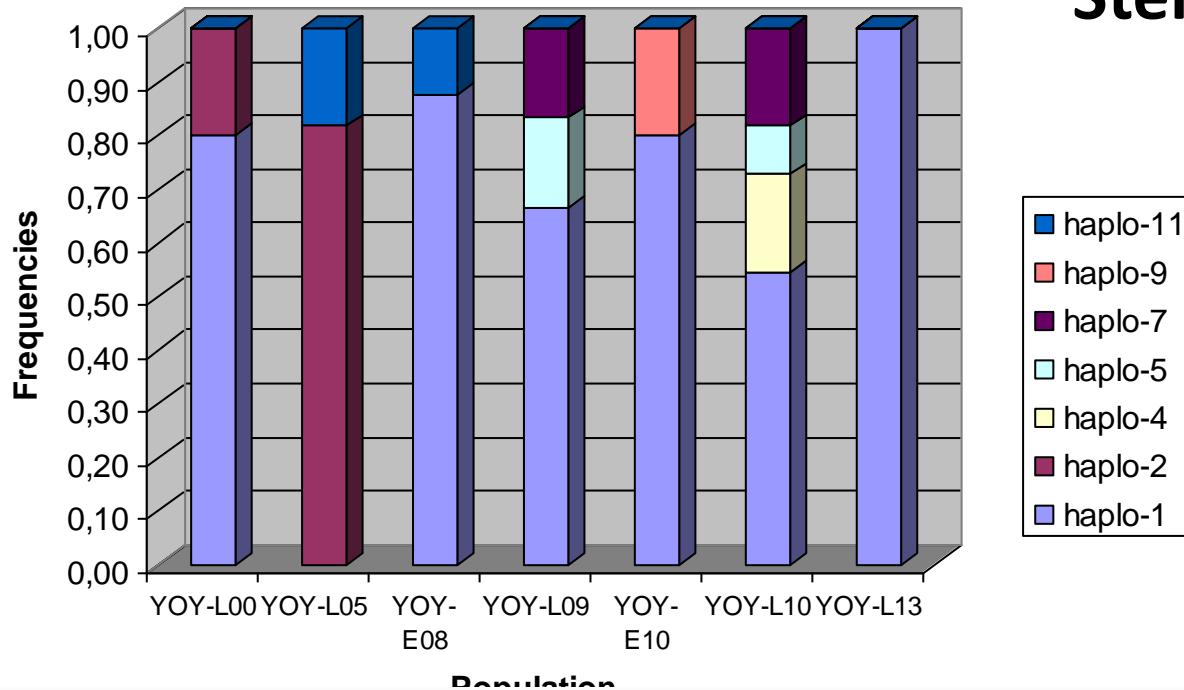
Beluga sturgeons

Cytochrome b RFLP
haplotype frequency
in groups of YOY
beluga sturgeons
(2004 - 2014)

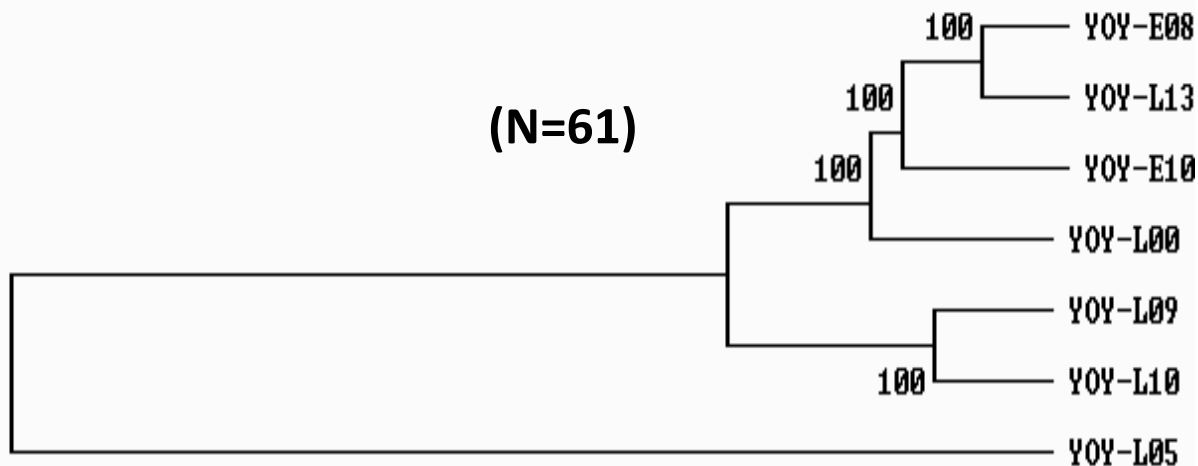


Neighbour Joining
dendrogram (Nei's DA)
based on gene frequencies
at mtDNA in YOY beluga
sturgeon groups captured
during **2004 - 2014**

Stellate sturgeons



Cytochrome *b* RFLP
haplotype frequency in
groups of YOY stellate
sturgeons



Neighbour Joining
dendrogram (Nei's DA)
based on gene frequencies
at mtDNA in YOY stellate
sturgeon groups captured
during 2000 - 2013

Conclusions:

1. Electro-narcosis proved adequate for reducing stress and subsequent drop back in adult sturgeons;
2. 3D bathymetry and ADCP velocity profiles are essential tools for understanding environmental conditions d/s Iron Gate dams;
3. Novel Thelma receiver **TBR 700** has the capability to record signal strength;
4. A combination of Vemco and Thelma acoustic tags and receivers will be used to achieve required resolution of sturgeon movements d/s Iron Gate dams;
5. Existing DNA samples collected during 2000 – 2014 will be used as reference for understanding genetic diversity of sturgeons arriving at the dams

Acknowledgements:

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Thank you for your attention!



Questions?