

Dam Removal/Modification Consultation

Date: February 19, 2020; **December 14, 2023**
Dam Names: Flat Rock Hydro Dam
Barrier ID: 442210020
Locations: 42.09975, -83.29585
Lake: Erie (4)
Stream: Huron (422)
Zones: 1
Stations: 15
Tributary: None
State: MI
County: Wayne

Issue: The Huron River is located in the southeastern lower peninsula of Michigan and empties into Lake Erie (see attached map). The Huron River Watershed Council is seeking monies for a feasibility study to remove the Flat Rock Hydro Dam on the Huron River. The Sea Lamprey Control Program considers the Flat Rock Hydro Dam the first blocking structure on the Huron River. If removed, it would open an additional 70 miles of river.

The Flat Rock Hydro dam is a vertical concrete structure standing approximately 10 feet high and 540 feet wide (see attached photos). The dam contains a denil fishway. In 2018, the Huron River Watershed Council had pursued monies to modify the fishway design to improve fish passage but has since turned their focus to full removal of the dam.

Update: The Huron-Clinton Metroparks Authority was the recipient of a NOAA grant to perform a feasibility study for the removal or remediation of the Flat Rock Dam. The feasibility study is currently underway, and the Sea Lamprey Control Program has been an advisor during the process.

Larval-phase assessment information: The Huron River has been surveyed 10 times since 1973. Historically, the river has been negative for larval sea lamprey, however three adults were captured in 1998 downstream of the dam during electrofishing surveys. Additionally, no native lamprey have been found upstream of the Flat Rock Hydro Dam.

A Sea Lamprey Production Potential survey was conducted in 2021 to assess the blocking potential of any barriers upstream of Flat Rock, the extent of native lamprey distributions, and to estimate the potential for a sea lamprey population upstream of the Flat Rock Dam. No lampreys were detected between Flat Rock and French Landing Dam, as such no production value was able to be calculated. However, larval lamprey detection surveys conducted upstream of the French Landing Dam did collect native lampreys indicating the Huron River is suitable for lamprey production.

Six locations were sampled for eDNA in October 2023 (three downstream of Flat Rock Dam and three upstream) to determine if sea lamprey spawning was successful and larval sea lampreys were present. A faint positive detection was collected at one site during the fall sampling indicating the plausibility of sea lamprey larvae being in the Huron River.

Spawning-phase assessment information: Spawning-phase assessments were done in the Huron River from 2011-2013 and captured 19 sea lamprey. Due to the low catch, no population estimate is available. The Huron River is not an Index stream. In the spring/summer of 2017 and 2018, the MI DNR maintained two acoustic receivers at the mouth of the Huron River. A total of 49 acoustically tagged lamprey were released into Lake Erie between December 2016 and February 2017 but only one of those was recorded entering the Huron River.

Three locations were sampled for eDNA immediately downstream of Flat Rock Dam in May 2023 to determine if adult sea lampreys were spawning in the Huron River. No positive detections for sea lamprey DNA were collected in the May sampling.

Lampricide control information: No lampricide treatments have been conducted within the Huron River. Treatment estimates were created from both the Flat Rock Hydro Dam and the French Landing Dam, the next upstream blocking structure. Using surrogate streams to estimate, total treatment costs would be \$484K and \$694K to treat downstream from the Flat Rock Hydro Dam and French Landing Dam respectively.

Barrier Team Recommendation: Sara Thomas (MI DNR) contacted the SLCP in August, 2019 looking for our position on multiple barrier related projects including the Flat Rock feasibility study. There was a pressing time issue for a decision so we informed her that a feasibility study was acceptable from the SLCP

perspective but ultimately that we did not agree with the removal of the Flat Rock Dam.

The removal project proposed by the Huron River Watershed Council could pose a threat to sea lamprey control in the Huron River. The Flat Rock Dam is recognized as the first blocking structure on the Huron River. While no larval sea lamprey have been collected, adults documented in the system indicate possible risk of infestation. Additionally, barrier evaluations conducted upstream of the dam have documented spawning gravel and indicate further potential for sea lamprey reproduction.

Therefore, it is the recommendation of the Alternative Control and Evaluation Unit that the SLCP conditionally agree to this particular feasibility project as we have previously commented. However, the SLCP requests follow up consultation should full removal be the chosen alternative. The ACE Unit would advocate for a modification of the structure over full removal and will perform Barrier QAS surveys upstream of the Flat Rock Dam in 2020 to assess the sea lamprey production potential of the Huron River system.

Since the SLCP was first contacted about the potential removal of the Flat Rock Dam, the Program had conducted additional surveys to identify the potential impacts of sea lampreys on the Huron River, including a production potential survey, eDNA collections, and the creation of a Risk Management Matrix.

While the risk appears low for a full infestation of sea lampreys in the Huron River, the combination of suitable spawning and larval habitat upstream of the Flat Rock Dam, and a positive detection of sea lamprey DNA in the fall, infestation of some degree is still plausible. Therefore, it is the recommendation of the Alternative Control and Evaluation Unit that if the current feasibility study recommends removal of the Flat Rock Dam, the SLCP would conditionally agree if some form of infrastructure to block future sea lampreys were incorporated in the design phase. The addition of stop logs channels or similar infrastructure to block future lamprey infestations, should require a small amount of effort up front, but would provide significant reductions in cost and lampricide treatments for the Huron River in the future if needed.

Attachments:

4.422_Consultation_Flat Rock Hydro Dam_Map.pdf

4.422_Consultation_Flat Rock Hydro Dam_Photo1.JPG

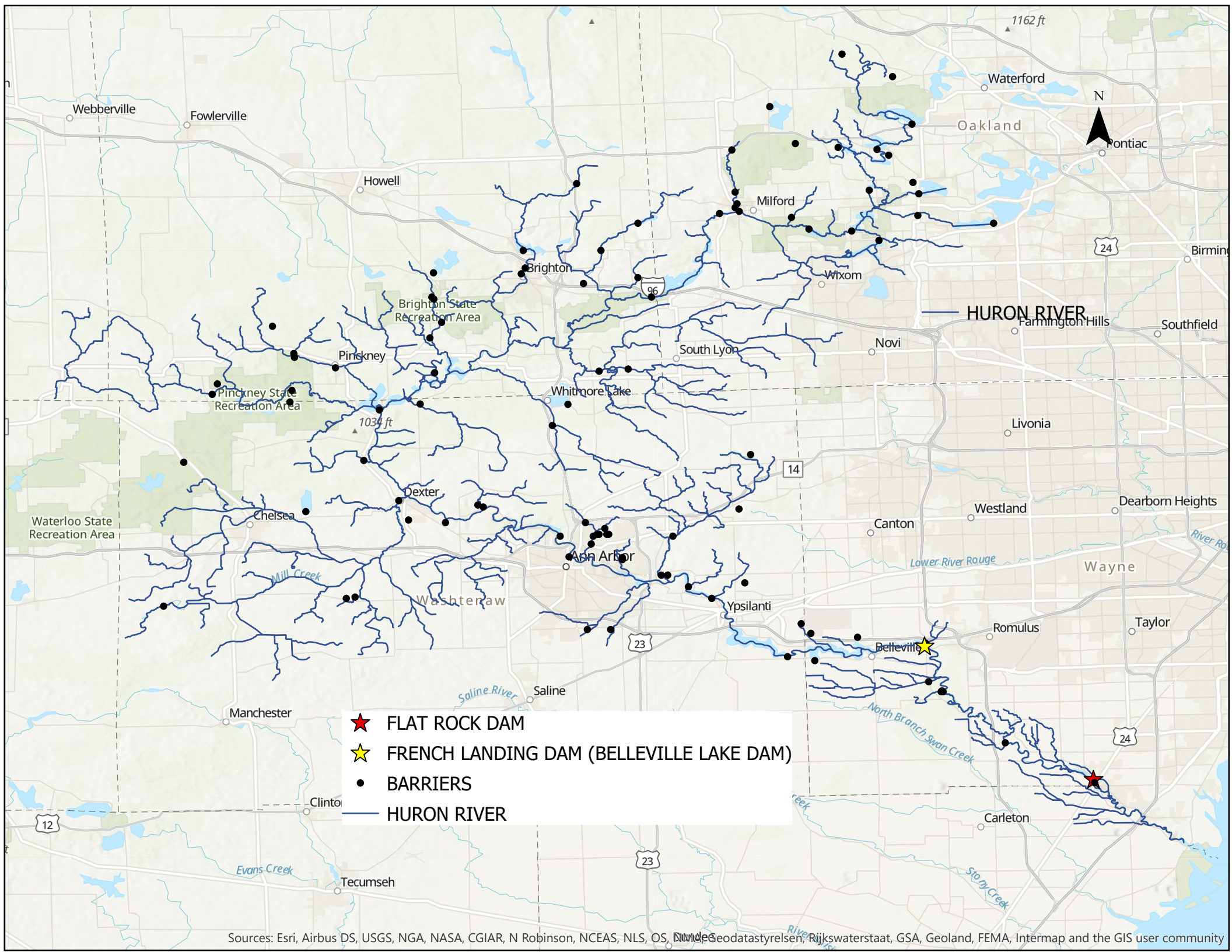
4.422. Flat Rock Hydro Dam.

4.422_Consultation_Flat Rock Hydro Dam_Photo2.JPG

4.422_Consultation_Flat Rock Hydro Dam_Photo3.JPG

4.422_Consultation_Flat Rock Hydro Dam_Data Table.xlsx

4.422_Consultation_Huron River Treatment Cost Estimate.docx



- ★ FLAT ROCK DAM
- ★ FRENCH LANDING DAM (BELLEVILLE LAKE DAM)
- BARRIERS
- HURON RIVER







NO
TRESPASSING

WATER QUALITY
MONITORING
STATION

3
2

Table 1. Larval lamprey frequency distribution within reaches of the Huron River (4.422) based on electrofishing surveys, 1973-2019. The Zone and Station where the Flat Rock Hydro Dam is located are highlighted in orange. Asterisk indicates adult lamprey.

Zone	Station	Reach Description	Sea Lamprey	Native Lamprey
1	5	Huron River - Mouth to jct. of Silver Creek		
1	10	Huron River - Jct. of Silver Creek to 1/4 mile below I-75 Expressway		10
1	15	Huron River - 1/4 mile below I-75 Expressway to dam at Flat Rock	3*	25
2	20	Huron River - Dam at Flat Rock to 1/4 mile above I-275 Expressway		
2	25	Huron River - 1/4 mile above I-275 Expressway to Belleville Lake Dam		
2	30	Belleville Lake - Entire		
2	35	Huron River - Inlet of Belleville Lake to Ford Lake Dam		
2	40	Ford Lake - Entire		
2	45	Huron River - Inlet of Ford Lake to 1/4 mile below U.S. 23		
2	50	Huron River - 1/4 mile below U.S. 23 to Burton Pond Dam		
2	55	Burton Pond - Entire		
2	60	Huron River - Inlet of Burton Pond (Huron River Drive - Sec. 11NE) to jct. of Mill Creek		
2	65	Huron River - Jct. of Mill Creek to Base Line Lake Dam		
3	100	Base Line Lakes - Entire (Includes Base Line Lake, Whitewood Lakes, Gallagher Lake, Loon Lake, Strawberry Lake, Zukey Lake, and interconnecting channels)		
3	105	Huron River - Inlet of Strawberry Lake to 1/4 mile above U.S. 23		
3	110	Huron River - 1/4 mile above U.S. 23 to Kent Lake Dam		
3	115	Kent Lake - Entire		
3	120	Huron River - Inlet of Kent Lake (Dawson Road) to outlet of Moss Lake (excluding Hubbell Pond)		
3	125	Hubbell Pond - Entire		
3	130	Proud Lakes - Entire (includes Moss Lake, Proud Lake, and interconnecting channels)		
3	135	Huron River - Inlet of Proud Lake to outlet of South Commerce Lake		
3	140	Commerce Lakes - Entire (includes South Commerce Lake, North Commerce Lake, and interconnecting channel)		
3	145	Huron River - Inlet of North Commerce Lake to outlet of Fox Lake		
3	150	Fox Lake - Entire		
3	155	Huron River - Inlet of Fox Lake to outlet of Cedar Island Lake (excluding Mud Lake)		
3	160	Cedar Island Lake - Entire		
3	165	Huron River - Inlet of Cedar Island Lake to outlet of Oxbow Lake		
3	170	Mud Lake - Entire		
3	175	Oxbow Lake - Entire		
3	180	Huron River - Inlet of Oxbow Lake to outlet of Pontiac Lake		
3	185	Pontiac Lake - Entire		
3	190	Huron River - Inlet of Pontiac Lake to source (Big Lake)		
4	200	Silver Creek to Huron River - Mouth (Sec. 24SE) to jct. of Smith Creek		
4	205	Silver Creek to Huron River - Jct. of Smith Creek to 1/4 mile above U.S. 24		
4	210	Silver Creek to Huron River - 1/4 mile above U.S. 24 to source (jct. of Hubert and Reiser Drains)		
4	215	Morrison Drain to Silver Creek - Entire (Enters from north in Sec. 23NE at East Rockwood)		
4	220	Smith Creek to Silver Creek - Mouth to 1/4 mile above Gibraltar Rd.		
4	225	Smith Creek to Silver Creek - 1/4 mile above Gibraltar Rd. to source (jct. of drain in Sec. 7SW near Inkster Rd.)		
4	230	All tributaries and drains to Smith Creek - Unless otherwise coded		
4	235	All other tributaries and drains to Silver Creek - Unless otherwise coded		
4	240	Bypass Channels between Huron River and Silver Creek - Entire (Sec. 23 and Sec. 24)		
4	245	Port Creek to Huron River - Entire (Enters from west in Sec. 8SE)		
4	250	Wagner and Pink Drain - Entire (Enters from west in Sec. 5SE)		
5	300	Griggs Drain to Huron River - Entire (Enters from WSW in Sec. 36NE)		
5	310	Willow Run to Huron River - Entire (Enters via Belleville Lake from NW in Sec. 19NE)		
5	320	Fleming Creek to Huron River - Entire (Enters from NW in Sec. 31NW east of Geddes)		
5	330	Honey Creek to Huron River - Entire (Enters from SW in Sec. 12SW on west edge of Foster)		3
5	350	Mill Creek to Huron River - Mouth to jct. of North Fork Mill Creek		29
5	355	Mill Creek to Huron River - Jct. of North Fork Mill Creek to 1/4 mile above Haist Rd. at Jerusalem		
5	360	Mill Creek to Huron River - 1/4 mile above Haist Rd. at Jerusalem to source		
5	365	North Fork Mill Creek to Mill Creek - Mouth to 1/4 mile above Garvey Rd.		
5	370	North Fork Mill Creek to Mill Creek - 1/4 mile above Garvey Rd. to source (Mill Lake)		
5	375	Letts Creek to North Fork Mill Creek - Entire (Enters from south in Sec. 6WC near Chelsea)		
5	380	All other tributaries and drains to North Fork Mill Creek - Unless otherwise coded		
5	385	All other tributaries and drains to Mill Creek - Unless otherwise coded		
6	400	Portage Lakes - Entire (includes Portage Lake and Little Portage Lake)		
6	405	Portage River to Portage Lakes - Mouth to outlet of Hi-Land Lake (Mill Pond)		
6	410	Hi-Land Lake (Mill Pond) - Entire		
6	415	Half Moon Lake Outlet to Hi-Land Lake (Mill Pond) - Mouth to outlet of Half Moon Lake		
6	420	Half Moon Lakes - Entire (Includes Half Moon Lake, Blind Lake, Watson Lake, Patterson Lake, Woodburn Lake, and interconnecting channels)		
6	430	Portage Creek to Woodburn Lake - Entire (Enters from west in Sec. 36NW)		
6	435	Honey Creek to Portage Lakes - Mouth to source (jct. of Anderson Drain and County Drain No. 1)		
6	440	All tributaries and drains to Honey Creek - Unless otherwise coded		
6	450	Arms Creek to Huron River - Entire (Enters via interconnecting channel between Base Line Lake and Whitewood Lakes in Sec. 32SW)		
6	455	Bass Lake Outlet to Huron River - Mouth to outlet of Bass Lake (Enters via Gallagher Lake in Sec. 28SW)		
6	460	Bass Lake - Entire		
6	465	Hay Creek to Bass Lake - Entire (Enters from west in Sec. 29NE)		
6	470	Chilson Creek to Huron River - Entire (Enters via Zukey Lake from north in Sec. 21SE - excluding Oneida Lake)		
6	475	Onedia Lake - Entire		
6	480	Sandy Bottom Lake Outlet - Mouth to outlet of Sandy Bottom Lake		
6	490	Sandy Bottom Lakes - Entire (includes Sandy Bottom Lake, Limekiln Lake, Dollar Lake and Ten Mile Lake)		
6	500	Davis Creek to Sandy Bottom Lakes - Entire (Enters via Ten Mile Lake from north in Sec. 22SE)		
6	510	All other tributaries to Sandy Bottom Lakes - Unless otherwise coded		
6	520	Woodruff Creek to Huron River - Entire (Enters from north in Sec. 2NW / Island Lake State Recreation Area)		4
6	530	Petticoat Creek to Huron River - Entire (Enters at east end of Hubbell Pond)		
6	540	Norton Creek to Huron River - Entire (Enters from SE in Proud Lake State Recreation Area)		
7	600	All other tributaries and drains to Huron River (below Flat Rock Dam) - Unless otherwise coded		
8	700	All other tributaries and drains to Huron River (above Flat Rock Dam) - Unless otherwise coded		
20	1	Lake Erie - Off mouth of Huron River		

4_422_Huron River

Treatment Estimate

It is difficult to construct a lampricide cost estimate for the Huron River due to all the unknowns. Data from currently treated streams was used to estimate the lampricide treatment cost for the Huron River. There are numerous USGS gauging stations throughout the system which are crucial in estimating lampricide costs. The labor estimate, measured in staff days, was made by comparing similar-sized streams that are currently treated with a similar drainage area and tributaries. The minimum lethal concentration (mlc) to calculate lampricide usage was taken from a similar Lake Erie stream that is currently treated for sea lampreys, the Clinton River. It is very difficult to estimate the effort necessary to treat the Huron River due to the amount of stream miles that could become infested if the Flat Rock or French Landing Dams were no longer sea lamprey blocking structures.

Lake Erie tributaries are difficult to treat outside the months of May and June due to severe pH fluctuations making a spring time treatment essential. Spring time annual flows average around 900 cfs, measured at the lowest USGS gauge on the system.

A system regularly treated for sea lampreys with stream miles and drainage area similar to the Huron River from the Flat Rock Dam is the Grand River (Lake Erie tributary). Recent treatments of the Grand River covered 31 stream miles accounting for 75 staff days worth of effort. Another system regularly treated for sea lampreys with stream miles and drainage area similar to the Huron River from the French Landing Dam is the Chippewa River (Lake Huron, Saginaw River tributary). The recent treatment of the Chippewa River covered 71 stream miles accounting for 181 staff days worth of effort.

With all treatment variables included the cost to treat the Huron River from the Flat Rock Dam is estimated at roughly \$484k. Average stream discharge of 900 cfs during the optimal treatment time with a desired lampricide concentration of 8.0 ppm (1.5 x 5.4 ppm mlc) totals \$408k in lampricide cost. Comparable effort from the Grand River treatment used to estimate staff day cost for the Huron River from Flat Rock Dam totals \$76k, cost of \$1,017/day for 75 staff days.

With all treatment variables included the cost to treat the Huron River from the French Landing Dam is estimated at roughly \$694k. Average stream discharge of 900 cfs during the optimal treatment time with a desired lampricide concentration of 8.0 ppm (1.5 x 5.4 ppm mlc), accounting for an additional conservation estimate of 25% attenuation, totals \$510k in lampricide cost. Comparable effort from the Chippewa River treatment used to estimate staff day cost for the Huron River from the French Landing Dam totals \$184k, cost of \$1,017/day for 181 staff days.

Without any additional data it is difficult to determine if the estimates for chemical and effort costs are under or over inflated. The best available data was used in the rough treatment cost estimates of the Huron River.

Jenna Tews
Treatment Supervisor
8/24/2019