

Watershed Assessment

North Central Native Trout

This Watershed Assessment answers the question “How are the fish in my watershed doing?”

We need to know this in order set appropriate fishing regulations, to understand and correct problems with fish habitat and to guard against invasive species.

A standard method of assessing the status of fish populations is necessary to allow comparisons of fish sustainability across time in a particular watershed, and to compare to other watersheds. Standardized assessments of fish populations within the East Slopes region of Alberta are also linked to recovery planning for species at risk (bull trout *Salvelinus confluentus*, westslope cutthroat trout *Oncorhynchus clarkii lewisi*, and Athabasca rainbow trout *Oncorhynchus mykiss*), whirling disease monitoring and mitigation, aquatic invasive species management, and the Provincial Roadway Watercourse Crossings Remediation programs.

Fish population assessments in watersheds

Alberta Environment and Parks (AEP) monitor fish in flowing waters using standardized electrofishing and habitat survey techniques (ABMI and ASRD 2014, ESRD 2013). Surveys typically occur between June and August. Within each watershed surveyed, important metrics including fish relative abundance (catch per unit effort (CUE)) and biological data (fish length) are collected to understand a population’s current status and to analyze trends across time. Information is collected from all fish species encountered to provide an understanding of fish community structure. Based on results from this program, AEP can determine if management actions are achieving desired fisheries management objectives.

Sampling is focused at a watershed scale to match the scope of the assessment with the geographic range of fish populations and to standardize effort

for data comparison. Watersheds are defined by the Hydrologic Unit Code (HUC) 10 or 8 boundaries, as identified by the HUC watersheds of Alberta classification system (ABMI and ASRD, 2014). Within a watershed, the number of samples sites is determined using power analysis to ensure trends can be detected and site locations are randomly distributed (Stevens and Olsen, 2004).

How is this information used?

Catch rates (i.e., backpack electrofishing: number of fish per 300 meters, float/boat electrofishing: number of fish per kilometer) of fish species are an indication of relative abundance. Consistently higher catch rates correspond to more fish in a watershed. Catch rates are compared to the standardized thresholds for five broad categories of risk to the long-term sustainability of the fish population, with higher densities of fish having lower risk (Table 1).

Table 1. Fish sustainability index (FSI) colour coding and categories. Thresholds are developed for each species and capture technique based on catch per unit effort (CUE) (Neufeld and MacPherson 2018).

Risk to Sustainability
Very Low
Low
Moderate
High
Very High

The distribution of sizes of fish can also provide clues on what factors may be limiting the population. For example, few large fish can indicate problems with overharvest and few small fish may be a sign that spawning habitat quality is poor. Biologists use this information, as well as data on water quality, access, fishing pressure, development, and habitat threats to: 1) understand the status of the fishery, 2) inform sustainable sportfishing regulations, and 3) make recommendations on land use, invasive species management and fish stocking.

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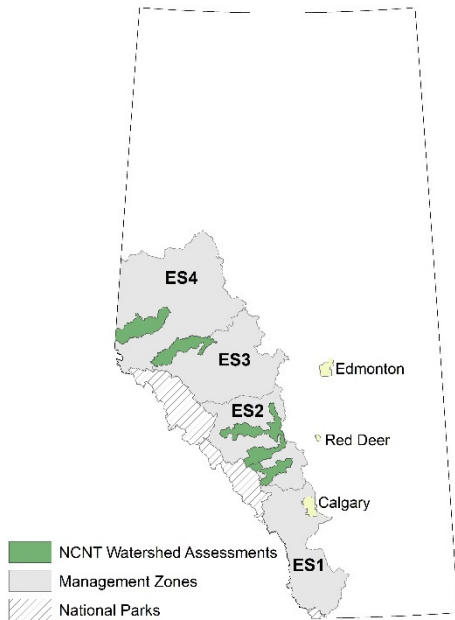
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Watershed Assessment

Assessments were conducted on the following watersheds for the North Central Native Trout (NCNT) program in 2017:

ES4- Kakwa River | **ES3-** Berland River
ES2- North Saskatchewan River, Clearwater River, Red Deer River



Kakwa River

The data suggests that bull trout are in a *very high risk to high risk* state when compared to provincial FSI standards and there is no evidence of recovery since at least 2001. Mountain whitefish are in a *high risk* state and Arctic grayling range from *very high risk* state in the tributaries to *moderate risk* state in the mainstem of the Kakwa River. Comparison with historic FSI values indicates that bull trout and Arctic grayling have declined from their past states which were *very low risk* state and *low risk* state respectively. To ensure the long-term sustainability of these fisheries, conservation-based management remains necessary.

Berland River

The data indicates that bull trout, mountain whitefish, rainbow trout, and Arctic grayling are in a

very high risk to high risk state when compared to provincial FSI standards. Analyses of past data suggest there is no strong evidence of recovery since at least 2008 for any of these species. Comparison with historic FSI for the Berland River values suggest that bull trout and Arctic grayling were previously at *very low risk* state, but have been impacted by a variety of limiting factors. To ensure the long-term sustainability of bull trout, Athabasca rainbow trout, Arctic grayling and mountain whitefish populations and fisheries, conservation-based management remains necessary.

North Saskatchewan River

The data suggests that bull trout are in a *high risk to very high risk* state when compared to provincial FSI standards. Currently, mountain whitefish are in a *moderate risk* state. To ensure the long-term sustainability of both the bull trout and mountain whitefish populations and fisheries, conservation-based management remains necessary.

Clearwater River

The data suggests that bull trout are in a *high risk to very high risk* state when compared to provincial FSI standards, and there is no strong evidence of recovery since at least 2004. Comparison with historic FSI values indicate that bull trout were *very low risk* state, but have been impacted by a variety of limiting factors. Currently, mountain whitefish are in a *high risk to moderate risk* state, but there is evidence that abundance is increasing since 2004. To ensure the long-term sustainability of both the bull trout and mountain whitefish populations and fisheries, conservation-based management remains necessary.

Red Deer River

The data suggests that bull trout are in a *high risk to moderate risk* state when compared to provincial FSI standards. To ensure the long-term sustainability of the bull trout population and fishery, conservation-based management remains necessary.

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Assessment Details

Kakwa River

The Kakwa River watershed (HUC 8) is located approximately 100 km south of Grande Prairie, AB (Figure 1). During the 2017 assessment, a total of 50 sites were sampled in the watershed (Figure 1). Ten species of fish were captured using float and backpack electrofishing (Table 2).

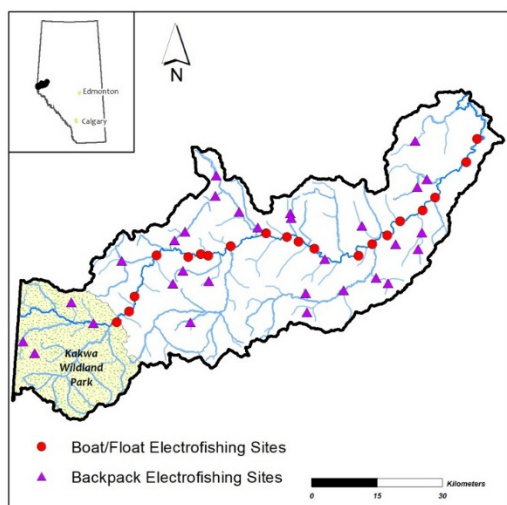


Figure 1. Sample sites assessed by float (n= 20) and backpack (n= 30) electrofishing within the Kakwa River watershed, 2017.

Table 2. Fish species captured during the Kakwa River assessment, 2017.

Common name	Number of fish
Arctic grayling	96
Bull trout	129
Longnose dace	31
Longnose sucker	38
Mountain whitefish	619
Pearl dace	50
Rainbow trout	80
Redside shiner	3
Slimy sculpin	2
White sucker	2

Bull trout

In total, 129 bull trout were captured in the 2017 assessment (Table 2). Average fork length for bull trout was 279 mm and ranged in size from of 69 mm to 630 mm (Figure 2). Based on average CUE from backpack and float electrofishing data, bull trout are in a **very high risk** to **high risk** state (Figures 3 and 5). These data appear to be similar to past assessments conducted in 2001 and 2006 (Figure 4 and 6).

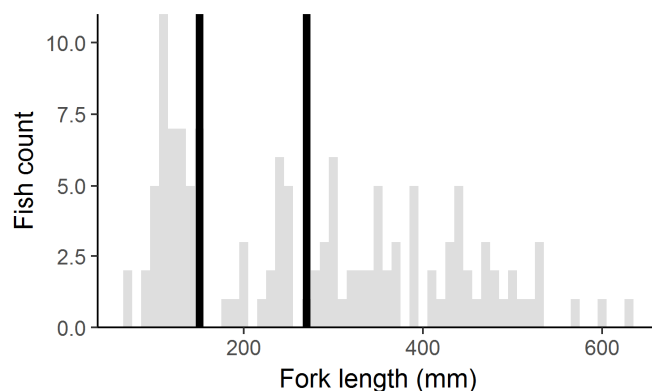


Figure 2. A summary of bull trout fork lengths (FL) in 10 mm bins from the 2017 assessment. Black vertical lines represent immature bull trout (< 150 mm FL) and mature bull trout (> 270 mm FL). Bull trout captured between 150 mm and 270 mm FL represent bull trout of an unknown maturity status as both resident and fluvial life histories exist in this watershed, which mature at different lengths.

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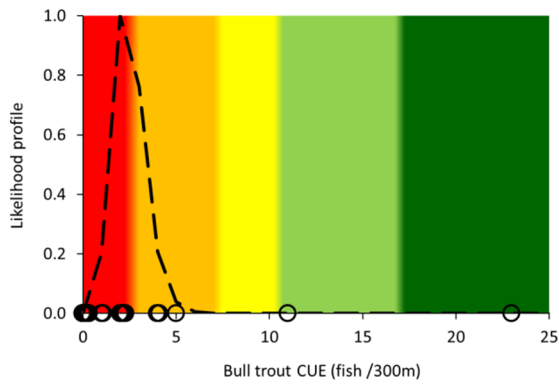


Figure 3. Bull trout total catch per unit effort (CUE) for backpack electrofishing in the Kakwa River, 2017. The dashed line represents mean CUE (2.0 fish / 300 m) with individual site CUE as hollow circles.

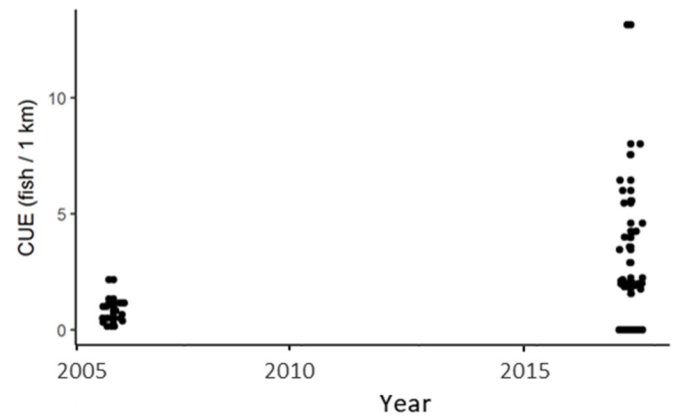


Figure 6. Bull trout float electrofishing catch per unit effort (CUE) over time. Each point represents CUE at an individual sampling site.

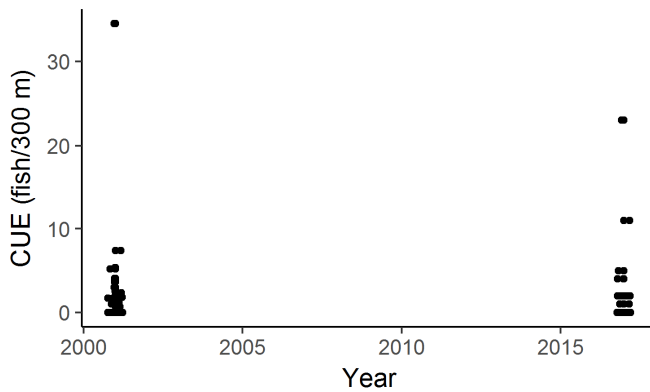


Figure 4. Bull trout backpack electrofishing catch per unit effort (CUE) over time. Each point represents an individual sampling site.

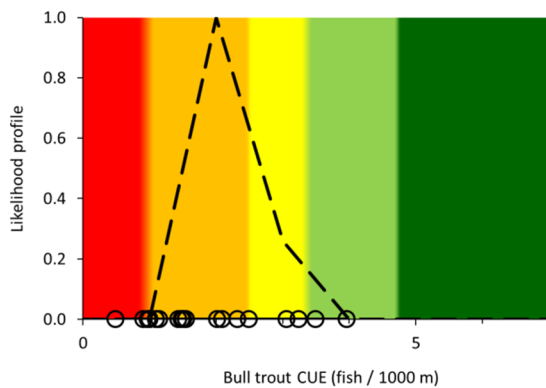


Figure 5. Bull trout total catch per unit effort (CUE) for float electrofishing in the Kakwa River, 2017. The dashed line represents mean CUE (1.8 fish / 1 km) with individual site CUE as hollow circles.

Mountain whitefish

In total, 619 mountain whitefish were captured in the 2017 assessment (Table 2). Average fork length for mountain whitefish was 201 mm, and ranged in size from 68 to 397 mm (Figure 7). Float electrofishing data suggest mountain whitefish are in a **high risk** state (Figure 8). Data collected in 2017 are slightly higher on average than data from 2001 (Figure 9).

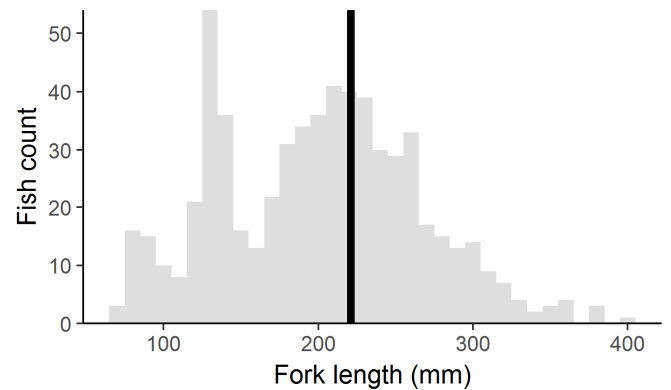


Figure 7. A summary of mountain whitefish fork lengths (FL) in 10 mm bins from the 2017 assessment. The black vertical line represents 50 per cent maturity for mountain whitefish (221 mm FL).

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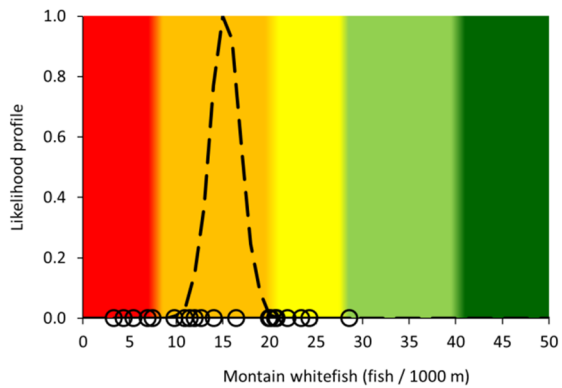


Figure 8. Mountain whitefish total catch per unit effort (CUE) for float electrofishing for the Kakwa River, 2017. The dashed line represents mean CUE (14.8 fish / 1 km) with individual site CUE as hollow circles.

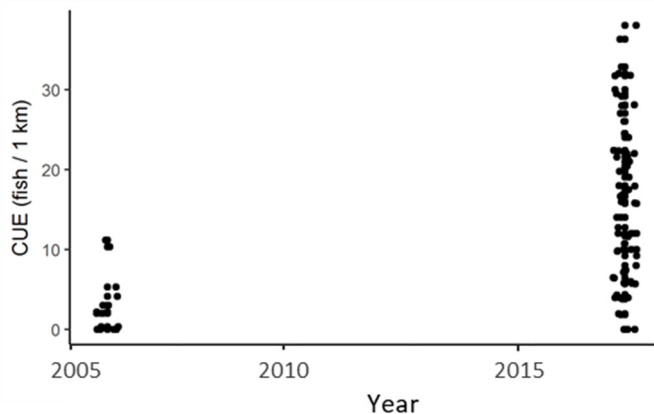


Figure 9. Mountain whitefish float electrofishing catch per unit effort (CUE) over time. Each point represents an individual sampling site.

Arctic grayling

In total, 96 Arctic grayling were captured in the 2017 assessment (Table 2). Average fork length for Arctic grayling was 216 mm, and ranged in size from 95 to 396 mm (Figure 10). Based on backpack and float electrofishing data Arctic grayling are in a **very high risk** to **moderate risk** state and have been there since at least 2001 (Figures 11-14).

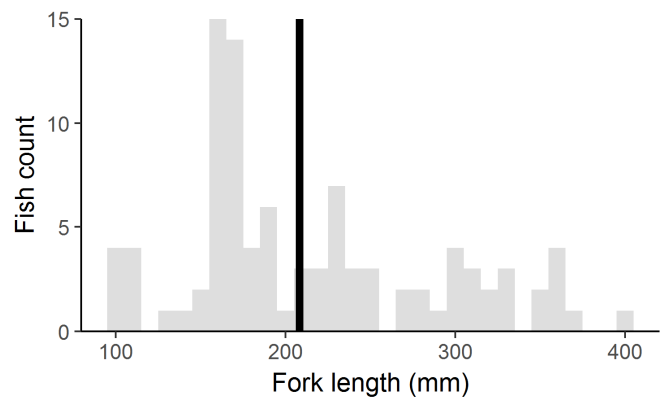


Figure 10. A summary of Arctic grayling fork lengths (FL) in 10 mm bins from the 2017 assessment. The black vertical line represents 50 per cent maturity for Arctic grayling (208 mm FL).

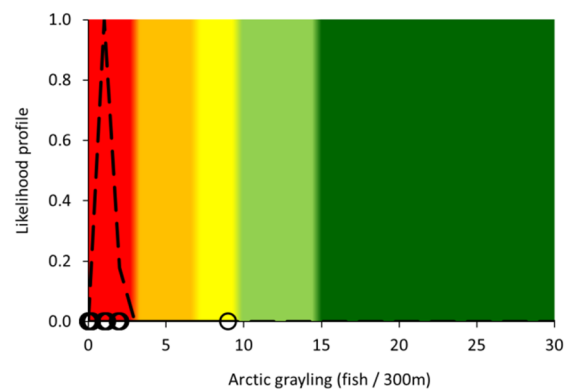


Figure 11. Arctic grayling total catch per unit effort (CUE) for backpack electrofishing for the Kakwa River, 2017. The dashed line represents mean CUE (0.7 fish / 300 m) with individual site CUE as hollow circles.

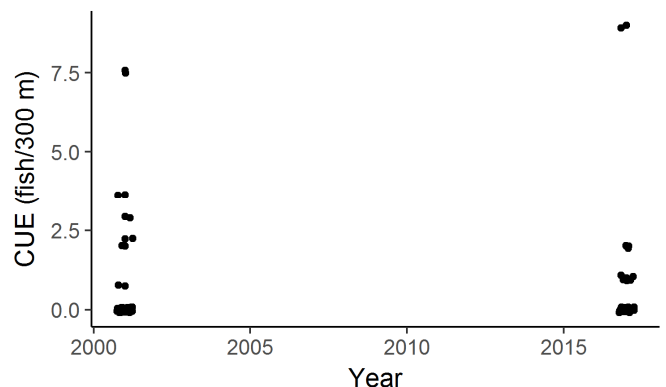


Figure 12. Arctic grayling backpack electrofishing catch per unit effort (CUE) over time. Each point represents an individual sampling site.

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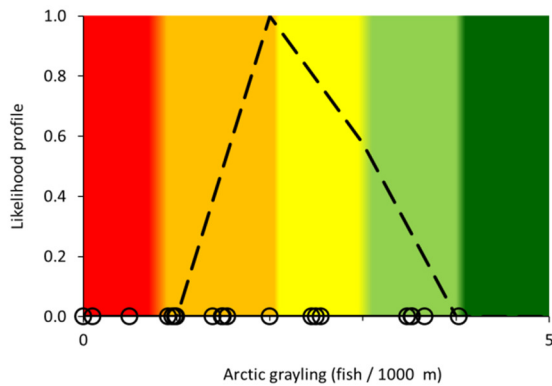


Figure 13. Arctic grayling total catch per unit effort (CUE) for float electrofishing for the Kakwa River, 2017. The dashed line represents mean CUE (1.9 fish / 1 km) with individual site CUE as hollow circles.

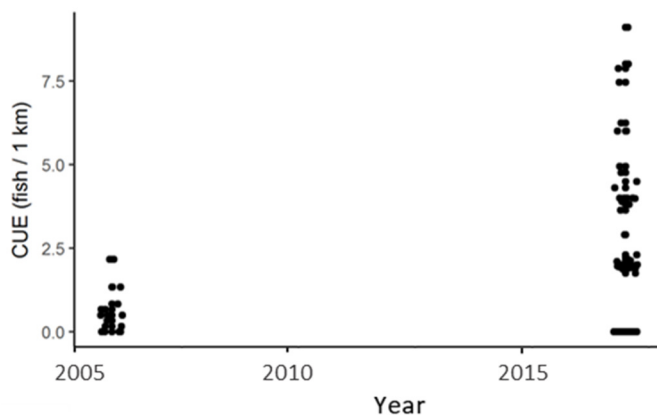


Figure 14. Arctic grayling float electrofishing catch per unit effort (CUE) over time. Each point represents an individual sampling site.

Summary

The 2017 data suggest that bull trout are in a **very high risk** to **high risk** state when compared to provincial FSI standards and there is no evidence of recovery since at least 2001. Mountain whitefish are in a **high risk** state and Arctic grayling range from **very high risk** state in the tributaries to **moderate risk** state in the mainstem of the Kakwa River. Comparison with historic FSI values indicates that bull trout and Arctic grayling have declined from their past states which were **very low risk** state and **low risk** state respectively. To ensure the long-term sustainability of these fisheries, conservation-based management remains necessary.

Literature cited

- Alberta Biodiversity Monitoring Institute and Alberta Sustainable Resource Development (ABMI and ASRD). 2014. Fish Survey Methods for Rivers: ABMI and ASRD Collaboration. Written by Jim Schiek and edited by M.G. Sullivan. Prepared for Alberta Biodiversity Monitoring Institute and Alberta Sustainable Resource Development. 20 pp.
- Alberta Environment and Sustainable Resource Development (ESRD). 2013. Standard for sampling of small streams in Alberta. Alberta Fisheries Management Branch, Fisheries Management Standards Committee. 19 pp.
- Neufeld, K. and MacPherson, L. 2018 Catch Rate Thresholds for the North Central Native Trout Recovery Program: Bull Trout, Arctic Grayling, Athabasca Rainbow Trout, and Mountain Whitefish 2018. Alberta Environment and Parks – Fisheries Management. - *Draft*
- Stevens, D.L. and Olsen, A. R. 2004. Spatially balanced sampling of natural resources. *Journal of the American Statistical Association* 99, 262-278.

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Assessment Details

Berland River

The Berland River watershed (HUC 8) is located approximately 275 km east of Edmonton, AB (Figure 1). During the 2017 assessment, a total of 54 sites were sampled in the watershed (Figure 1). 12 species of fish were captured using boat and backpack electrofishing (Table 2).

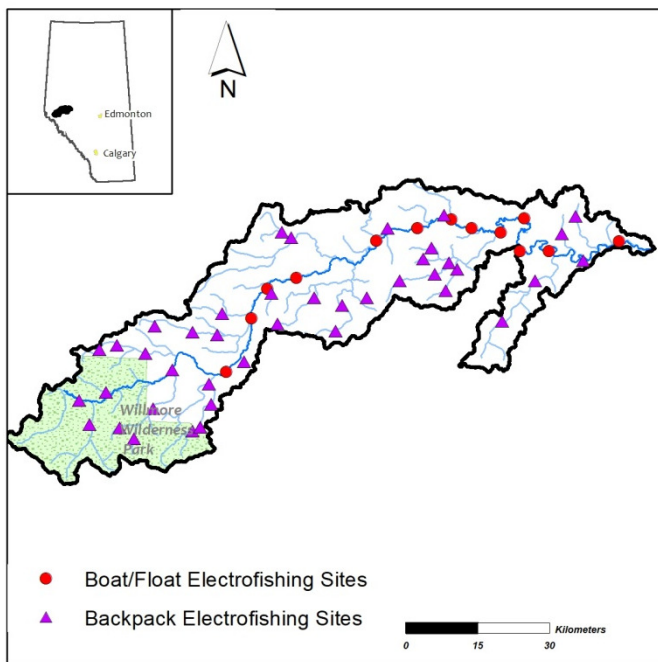


Figure 1. Sample sites assessed by boat (n=13) and backpack (n= 41) electrofishing within the Berland River watershed, 2017.

Table 2. Fish species captured in the Berland River, 2017.

Common name	Number of Fish
Arctic grayling	20
Brook trout	1
Bull trout	97
Lake Chub	2
Longnose dace	3
Longnose sucker	61
Mountain whitefish	288
Northern pike	2
Pearl dace	1
Rainbow trout*	179
Spoonhead sculpin	1
White sucker	6

*Past assessments of rainbow trout captured in the Berland River have identified genetically pure Athabasca rainbow trout in this watershed.

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Bull trout

In total, 97 bull trout were captured in the 2017 assessment (Table 2). Average fork length for bull trout was 221 mm and ranged in size from of 32 mm to 630 mm (Figure 2). Based on information from previous assessments, bull trout have remained in a **high risk** to **very high risk** state since at least 2008 considering both backpack and boat electrofishing data (Figures 3-6). Based on trend analysis of boat electrofishing, bull trout relative abundance has not increased since at least 2008 remaining at low CUE (Figure 6).

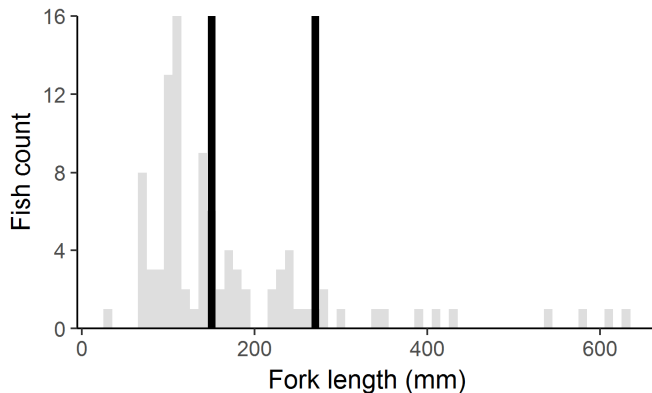


Figure 2. A summary of bull trout fork lengths (FL) in 10 mm bins from the 2017 assessment. Black vertical lines represent immature bull trout (< 150 mm FL) and mature bull trout (> 270 mm FL). Bull trout captured between 150 mm and 270 mm FL represent bull trout of an unknown maturity status as both resident and fluvial life histories exist in this watershed, which mature at different lengths.

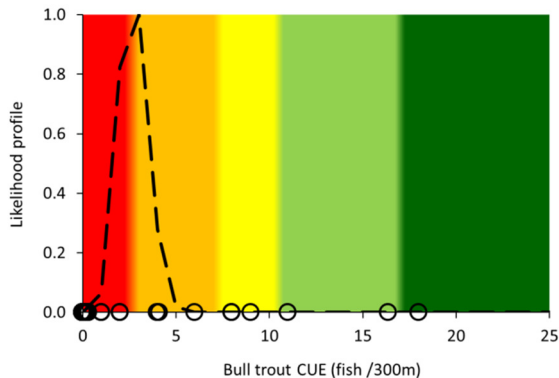


Figure 3. Bull trout total catch per unit effort (CUE) for backpack electrofishing in the Berland River, 2017. The dashed line represents mean CUE (2.2 fish / 300 m) with individual site CUE as hollow circles.

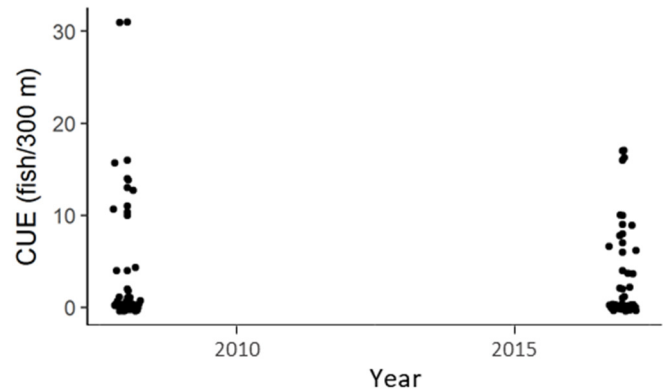


Figure 4. Estimated bull trout backpack electrofishing catch per unit effort (CUE) over time. The black points represent individual site CUE. We did not analyze slope of the trend in CUE among years because trend analysis cannot be conducted on two years of data.

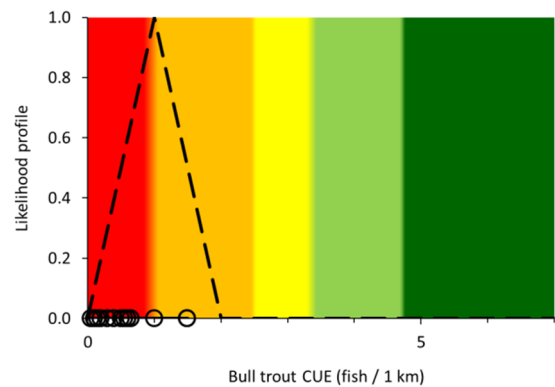


Figure 5. Bull trout total catch per unit effort (CUE) for boat electrofishing in the Berland River, 2017. The dashed line represents mean CUE (0.5 fish / 1 km) with individual site CUE as hollow circles.

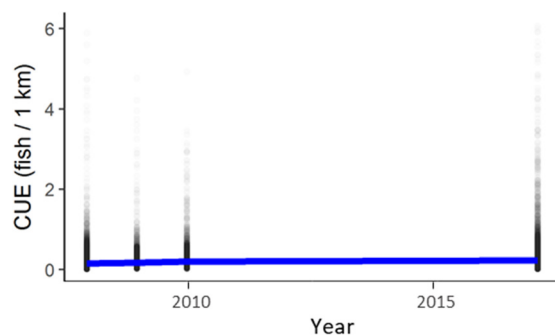


Figure 6. Estimated bull trout boat electrofishing catch per unit effort (CUE) over time. The black smudges represent the annual data distribution. The blue line is estimated CUE trend.

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Mountain whitefish

In total, 288 mountain whitefish were captured in the 2017 assessment (Table 2). Average fork length for mountain whitefish was 209 mm, and ranged in size from 81 to 434 mm (Figure 7). Based on information from previous boat electrofishing assessments, mountain whitefish have remained in a **high risk** state since at least 2008 (Figures 8-9).

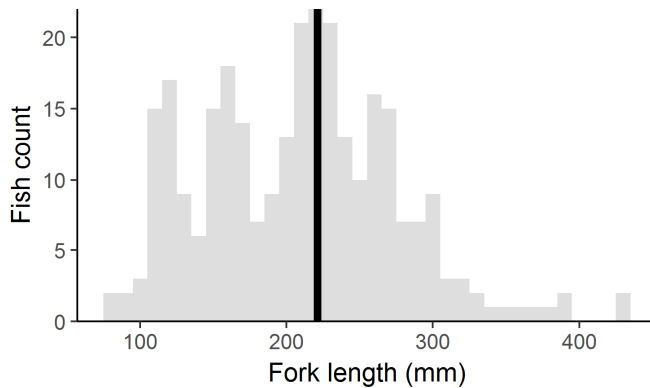


Figure 7. A summary of mountain whitefish fork lengths (FL) in 10 mm bins from the 2017 assessment. The black vertical line represents 50 per cent maturity for mountain whitefish (221 mm FL).

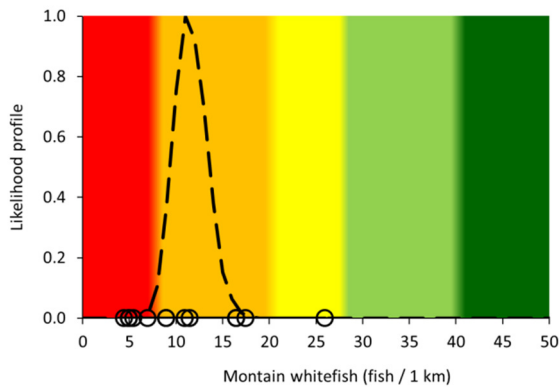


Figure 8. Mountain whitefish total catch per unit effort (CUE) for boat electrofishing for the Berland River, 2017. The dashed line represents mean CUE (11.1 fish / 1 km) with individual site CUE as hollow circles.

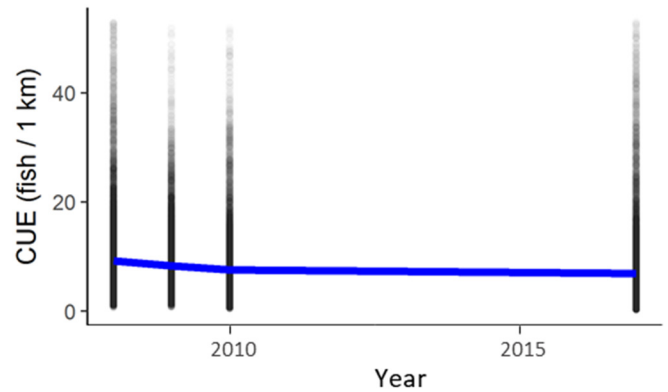


Figure 9. Estimated mountain whitefish boat electrofishing catch per unit effort (CUE) over time. The black smudges represent annual data distributions. The blue line is estimated CUE trend.

Rainbow trout

In total, 179 rainbow trout were captured in the 2017 assessment (Table 2). Average fork length for rainbow trout was 143 mm, and ranged in size from 47 to 334 mm (Figure 10). Based on past assessments, genetically pure Athabasca rainbow trout have been documented in the drainage and represent a subset of this sample. The 2017 assessment indicates rainbow trout are in a **very high risk** state. Based on information from previous backpack electrofishing assessments, rainbow trout have remained in a **very high risk** state since at least 2008 (Figures 11 and 12).

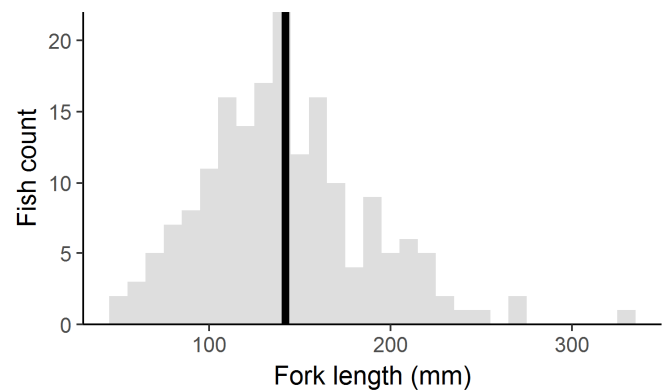


Figure 10. A summary of rainbow trout fork lengths (FL) in 10 mm bins from the 2017 assessment. The black vertical line represents 50 per cent maturity for Athabasca rainbow trout (142 mm FL).

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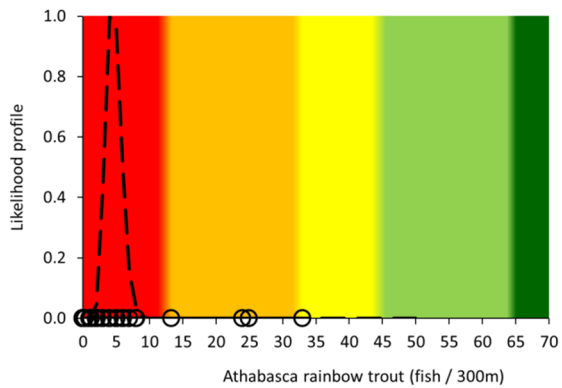


Figure 11. Rainbow trout total catch per unit effort (CUE) for backpack electrofishing for the Berland River, 2017. The dashed line represents mean CUE (4.1 fish / 300 m) with individual site CUE as hollow circles.

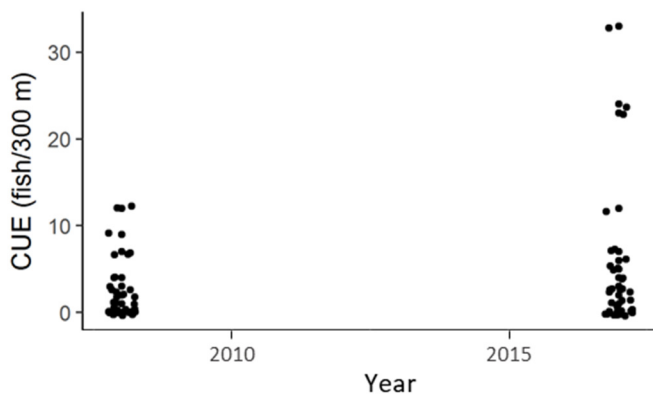


Figure 12. Estimated rainbow trout backpack electrofishing catch per unit effort (CUE) over time. The black points represent individual site CUE. We did not analyze slope of the trend in CUE among years because trend analysis cannot be conducted on two years of data.

Arctic grayling

In total, 20 Arctic grayling were captured in the 2017 assessment (Table 2). Average fork length for Arctic grayling was 258 mm, and ranged in size from 125 to 369 mm (Figure 13). Based on information from previous assessments, Arctic grayling have remained in a **high risk** state since at least 2008 considering boat electrofishing data (Figures 14 and 15).

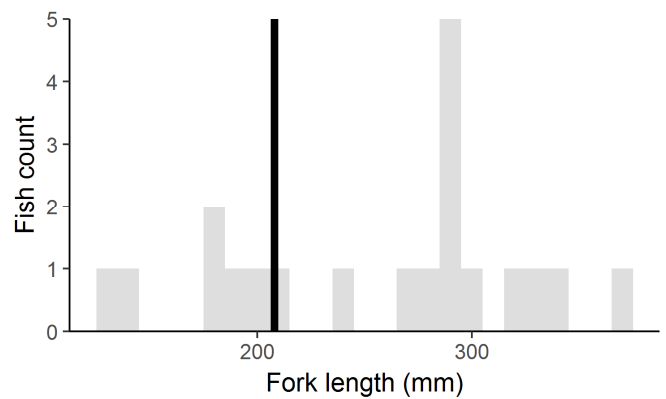


Figure 13. A summary of Arctic grayling trout fork lengths (FL) in 10 mm bins from the 2017 assessment. The black vertical line represents 50 per cent maturity for Arctic grayling (208 mm FL).

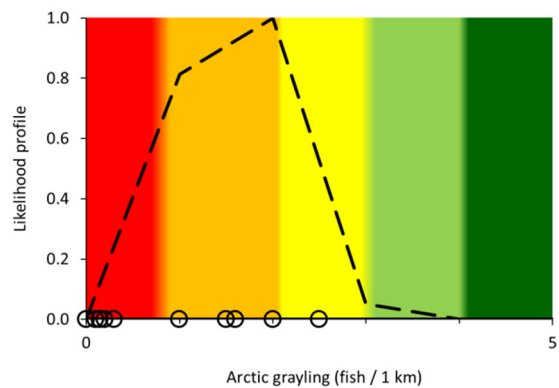


Figure 14. Arctic grayling total catch per unit effort (CUE) for boat electrofishing for the Berland River, 2017. The dashed line represents mean CUE (1.1 fish / 1 km) with individual site CUE as hollow circles.

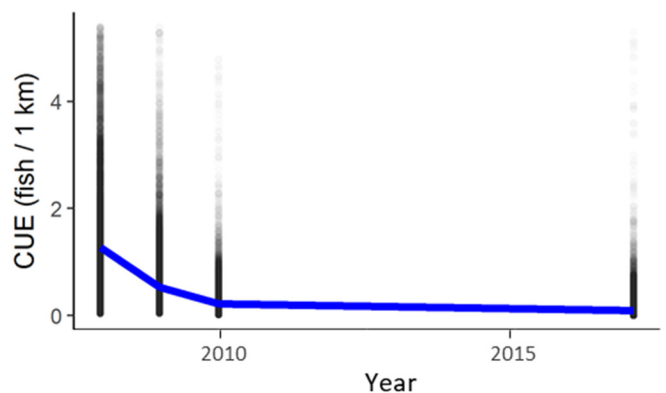


Figure 15. Estimated Arctic grayling boat electrofishing catch per unit effort (CUE) over time. The black smudges represent annual data distributions. The blue line is estimated CUE trend.

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Summary

The 2017 data indicate that bull trout, mountain whitefish, rainbow trout, and Arctic grayling are in a **very high risk** to **high risk** state when compared to provincial FSI standards. Analyses of past data suggest there is no strong evidence of recovery since at least 2008 for any of these species. Comparison with historic FSI for the Berland River values suggest that bull trout and Arctic grayling were previously at **very low risk** state, but have been impacted by a variety of limiting factors. To ensure the long-term sustainability of bull trout, Athabasca rainbow trout, Arctic grayling and mountain whitefish populations and fisheries, conservation-based management remains necessary.

Literature cited

- Alberta Biodiversity Monitoring Institute and Alberta Sustainable Resource Development (ABMI and ASRD). 2014. Fish Survey Methods for Rivers: ABMI and ASRD Collaboration. Written by Jim Schiek and edited by M.G. Sullivan. Prepared for Alberta Biodiversity Monitoring Institute and Alberta Sustainable Resource Development. 20 pp.
- Alberta Environment and Sustainable Resource Development (ESRD). 2013. Standard for sampling of small streams in Alberta. Alberta Fisheries Management Branch, Fisheries Management Standards Committee. 19 pp.
- Neufeld, K. and MacPherson, L. 2018 Catch Rate Thresholds for the North Central Native Trout Recovery Program: Bull Trout, Arctic Grayling, Athabasca Rainbow Trout, and Mountain Whitefish 2018. Alberta Environment and Parks – Fisheries Management. - *Draft*
- Stevens, D.L. and Olsen, A. R. 2004. Spatially balanced sampling of natural resources. *Journal of the American Statistical Association* 99, 262-278.

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Assessment Details

North Saskatchewan River

The North Saskatchewan River watershed (HUC 8) is located approximately 160 km northwest of Calgary, AB (Figure 1). During the 2017 assessment, a total of 15 sites were sampled in the watershed (Figure 1). In total, 12 species of fish were captured using boat electrofishing (Table 2).

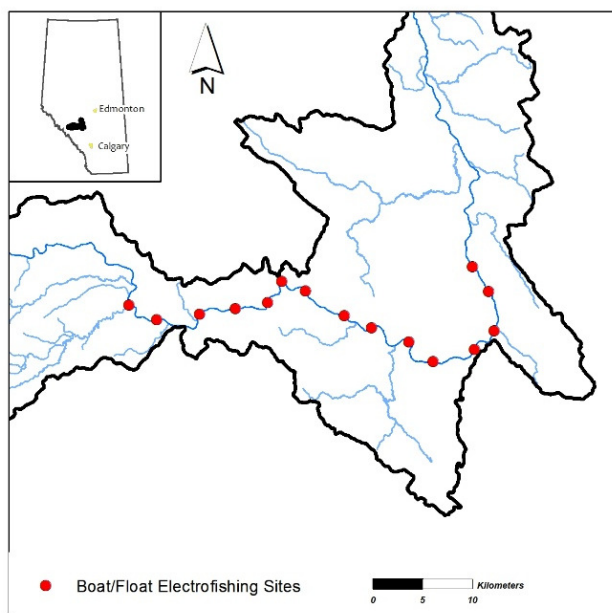


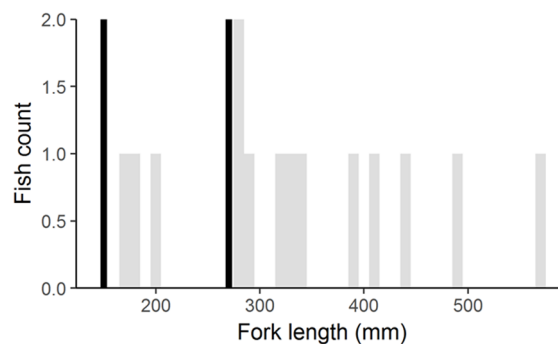
Figure 1. Sample sites assessed by float (n = 15) electrofishing within the North Saskatchewan River watershed in 2017.

Table 2. Fish species captured in the North Saskatchewan River, 2017.

Common name	Number of fish
Brook trout	11
Brown trout	48
Bull trout	14
Cutthroat trout	3
Lake chub	95
Longnose dace	29
Longnose sucker	104
Mountain sucker	79
Mountain whitefish	675
Shorthead redhorse	3
Walleye	3
White sucker	8

Bull trout

In total, 14 bull trout were captured in the 2017 assessment (Table 2). Average fork length for bull trout was 335 mm and ranged in size from 168 mm to 573 mm (Figure 2). Based on information collected from float electrofishing data in 2017, bull trout are currently in a **high risk** to **very high risk** state (Figure 3).



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Figure 2. A summary of bull trout fork lengths (FL) in 10 mm bins from the 2017 assessment. Black vertical lines represent immature bull trout (< 150 mm FL) and mature bull trout (> 270 mm FL). Bull trout captured between 150 mm and 270 mm FL represent bull trout of an unknown maturity status as both resident and fluvial life histories exist in this watershed, which mature at different lengths.

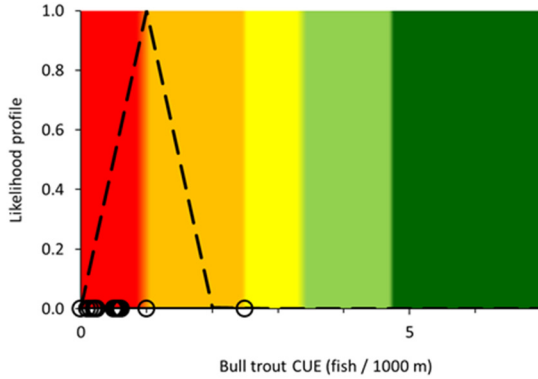


Figure 3. Bull trout total catch per unit effort (CUE) for boat electrofishing in the North Saskatchewan River, 2017. The dashed line represents mean CUE (0.47 fish / 1 km) with individual site CUE as hollow circles.

Mountain whitefish

In total, 675 mountain whitefish were captured in the 2017 assessment (Table 2). Average fork length for mountain whitefish was 251 mm, and ranged in size from 69 to 478 mm (Figure 4). Based on information from the 2017 boat electrofishing survey, mountain whitefish are currently in a **moderate risk** state (Figure 5).

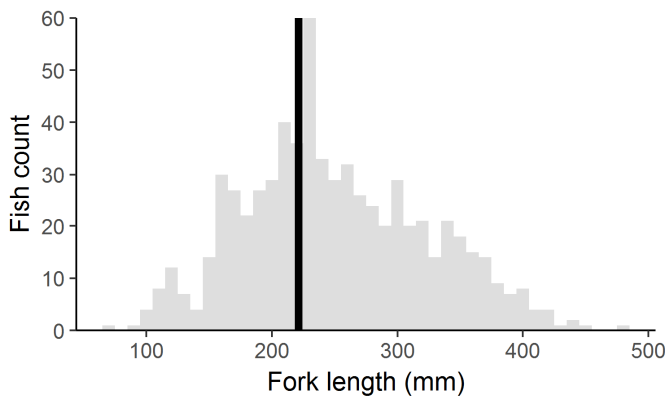


Figure 4. A summary of mountain whitefish fork lengths (FL) in 10 mm bins from the 2017 assessment. The black vertical line represents 50 % maturity for mountain whitefish (221 mm FL).

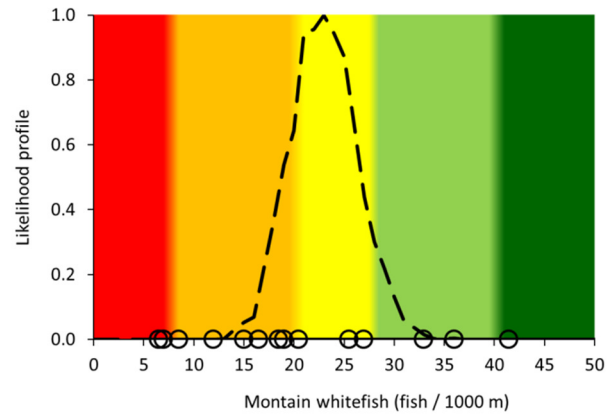


Figure 5. Mountain whitefish total catch per unit effort (CUE) for boat electrofishing for the North Saskatchewan River, 2017. The dashed line represents mean CUE (22.5 fish / 1 km) with individual site CUE as hollow circles.

Summary

The 2017 data suggest that bull trout are in a **high risk** to **very high risk** state when compared to provincial FSI standards. Currently, mountain whitefish are in a **moderate risk** state. To ensure the long-term sustainability of both the bull trout and mountain whitefish populations and fisheries, conservation-based management remains necessary.

Literature cited

Alberta Biodiversity Monitoring Institute and Alberta Sustainable Resource Development (ABMI and ASRD). 2014. Fish Survey Methods for Rivers: ABMI and ASRD Collaboration. Written by Jim

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Assessment Details

Clearwater River

The Clearwater River watershed (HUC 8) is located approximately 180 km northwest of Calgary, AB (Figure 1). During the 2017 assessment, a total of 43 sites were sampled in the watershed (Figure 1). Six species of fish were captured using float and backpack electrofishing (Table 2).

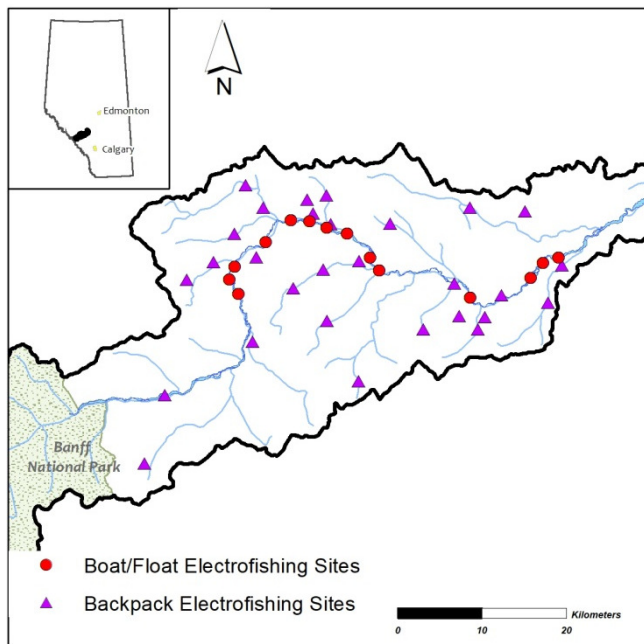


Figure 1. Sample sites assessed by float and backpack electrofishing within the Clearwater River watershed, 2017.

Table 2. Fish species captured during the Clearwater River assessment, 2017.

Common name	Number of fish
Brook trout	708
Brown trout	80
Bull trout	165
Bull trout X brook trout	7
Burbot	4
Longnose dace	7
Mountain whitefish	536

Bull trout

In total, 165 bull trout were captured in the 2017 assessment (Table 2). Average fork length for bull trout was 221 mm and ranged in size from 44 mm to 680 mm (Figure 2). Based on information from previous assessments, bull trout have remained in a **high risk** to **very high risk** state since 2004 considering both backpack and float electrofishing data (Figures 3-6). Based on trend analysis of float and backpack electrofishing, bull trout relative abundance has not increased since 2004, remaining at a low CUE (Figure 4).

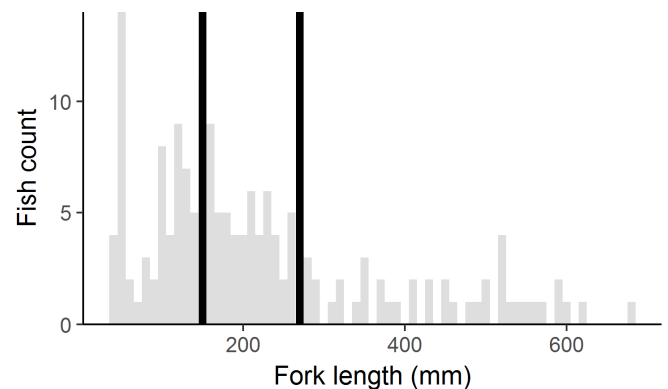


Figure 2. A summary of bull trout fork lengths (FL) in 10 mm bins from the 2017 assessment. Black vertical lines represent immature bull trout (< 150 mm FL) and mature bull trout (> 270 mm FL). Bull trout captured between 150 mm and 270 mm FL represent bull trout of an unknown maturity status as both resident and fluvial life histories exist in this watershed, which mature at different lengths.

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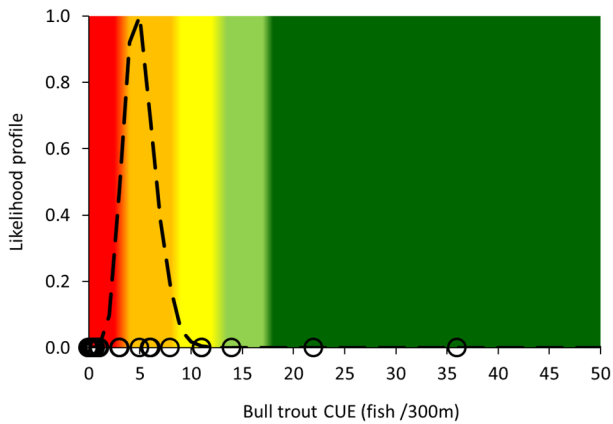


Figure 3. Bull trout total catch per unit effort (CUE) for backpack electrofishing in the Clearwater River watershed, 2017. The dashed line represents mean CUE (4.5 fish / 300 m) with individual site CUE as hollow circles.

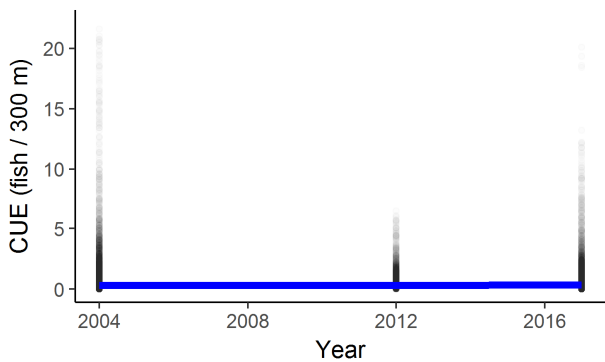


Figure 4. Estimated trend in bull trout backpack electrofishing catch per unit effort (CUE) over time. The black smudges represent the annual data distributions. The blue line is estimated CUE trend.

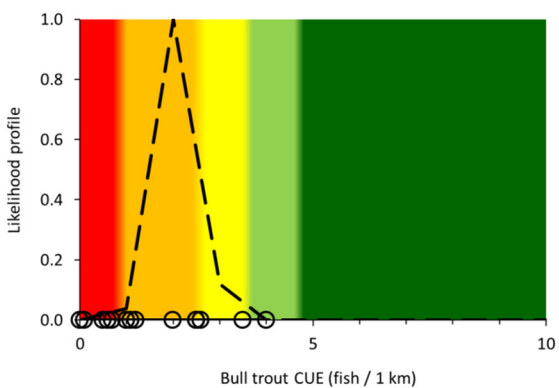


Figure 5. Bull trout total catch per unit effort (CUE) for float electrofishing in the Clearwater River, 2017. The dashed line represents mean CUE (1.6 fish / 1 km) with individual site CUE as hollow circles.

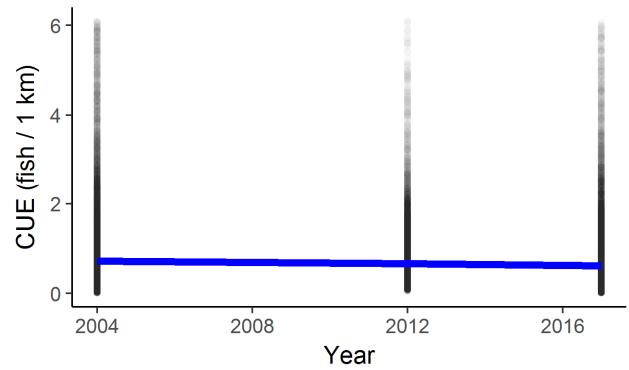


Figure 6. Estimated bull trout boat electrofishing catch per unit effort (CUE) over time. The black smudges represent the annual data distribution. The blue line is estimated CUE trend.

Mountain whitefish

In total, 536 mountain whitefish were captured in the 2017 assessment (Table 2). Average fork length for mountain whitefish was 246 mm, and ranged in size from 57 to 403 mm (Figure 7). Based on information from the 2017 assessment, mountain whitefish are currently in a **high risk** to **moderate risk** state (Figures 8). Trend analysis of boat electrofishing for mountain whitefish suggests a positive increase since 2004 (Figure 9).

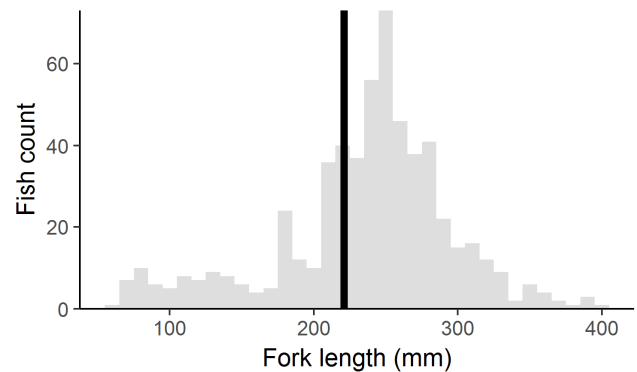


Figure 7. A summary of mountain whitefish fork lengths (FL) in 10 mm bins from the 2017 assessment. The black vertical line represents 50 per cent maturity for mountain whitefish (221 mm FL).

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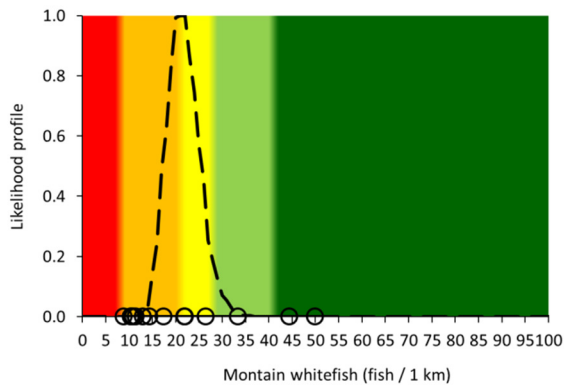


Figure 8. Mountain whitefish total catch per unit effort (CUE) for boat electrofishing for the Clearwater River, 2017. The dashed line represents mean CUE (21.2 fish / 1 km) with individual site CUE as hollow circles.

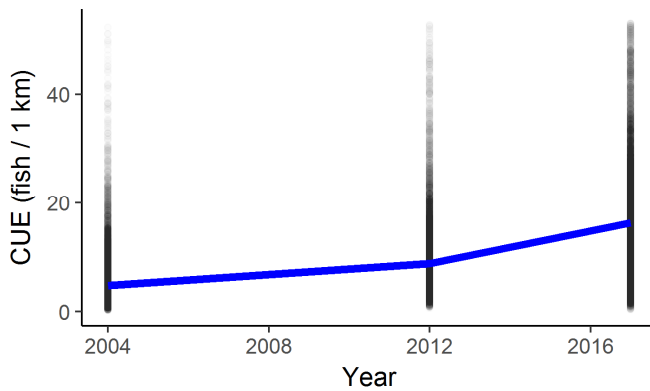


Figure 9. Estimated mountain whitefish boat electrofishing catch per unit effort (CUE) over time. The black smudges represent annual data distributions. The blue line is estimated CUE trend.

Summary

The 2017 data suggest that bull trout are in a **high risk** to **very high risk** state when compared to provincial FSI standards, and there is no strong evidence of recovery since at least 2004. Comparison with historic FSI values indicate that bull trout were **very low risk** state, but have been impacted by a variety of limiting factors. Currently, mountain whitefish are in a **high risk** to **moderate risk** state, but there is evidence that abundance is increasing since 2004. To ensure the long-term sustainability of both the bull trout and mountain whitefish populations and fisheries, conservation-based management remains necessary.

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Assessment Details

Red Deer River

The Upper Red Deer River watershed (HUC 8) is located approximately 100 km northwest of Calgary, AB (Figure 1). During the 2017 assessment, a total of 31 sites were sampled in the watershed (Figure 1). A total of four species of fish were captured using backpack electrofishing (Table 2).

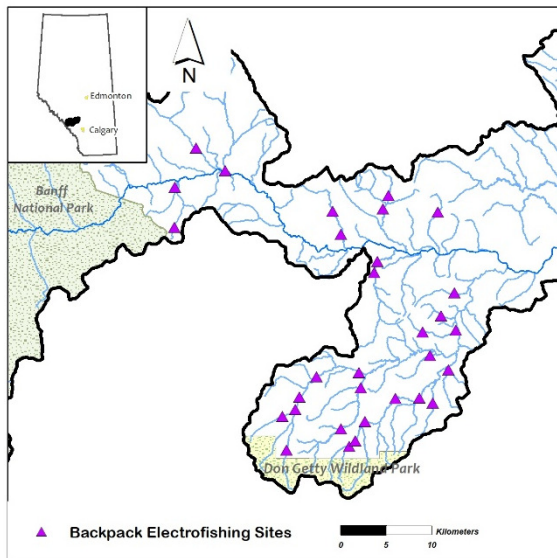


Figure 1. Sample sites (n=31) assessed by backpack electrofishing within the Upper Red Deer River watershed, 2017.

Table 2. Fish species captured in the Upper Red Deer River, 2017.

Common name	Number of fish
Brook trout	436
Bull trout	229
Mountain whitefish	4
Rainbow trout	1

Bull trout

In total, 229 bull trout were captured in the 2017 assessment (Table 2). Average fork length for bull trout was 191 mm and ranged in size from of 36 mm to 507 mm (Figure 2). Based on information from backpack electrofishing (7.4 fish/300m), bull trout are currently in a *high risk to moderate risk* state (Figure 3) and have likely been there since at least 2014 (Figure 4).

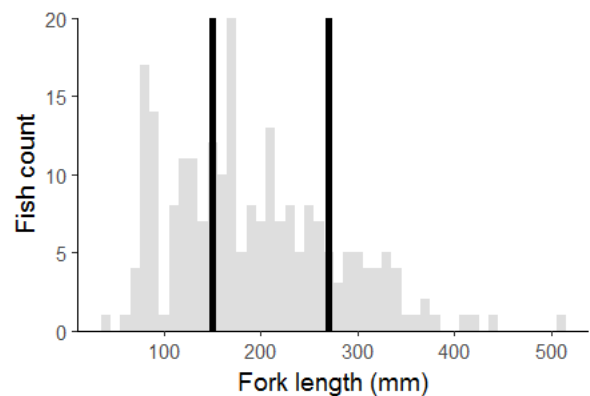


Figure 2. A summary of bull trout fork lengths (FL) in 10 mm bins from the 2017 assessment. Black vertical lines represent immature bull trout (< 150 mm FL) and mature bull trout (> 270 mm FL). Bull trout captured between 150 mm and 270 mm FL represent bull trout of an unknown maturity status as both resident and fluvial life histories exist in this watershed, which mature at different lengths.

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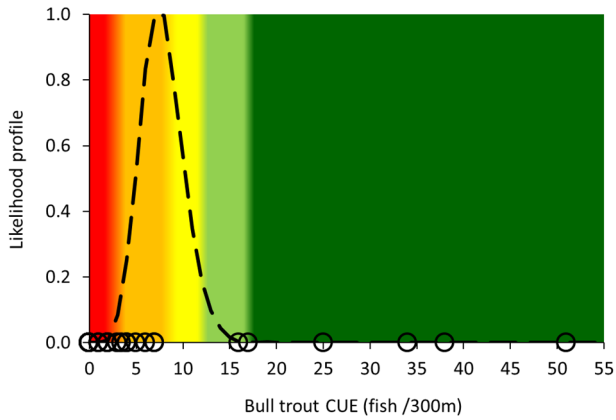


Figure 3. Bull trout total catch per unit effort (CUE) for backpack electrofishing in the Upper Red Deer River, 2017. The dashed line represents mean CUE (7.4 fish / 300 m) with individual site CUE as hollow circles.

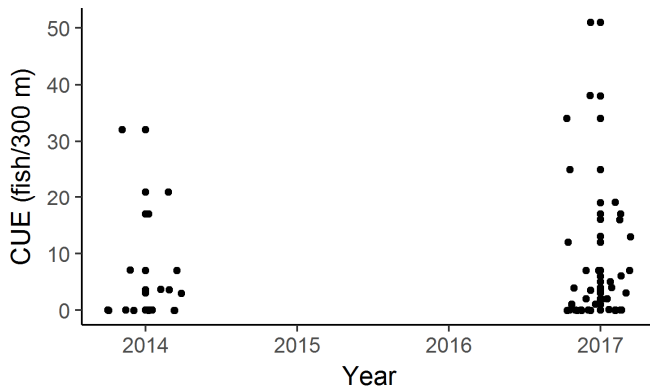


Figure 4. Bull trout backpack electrofishing catch per unit effort (CUE) over time. Each point represents CUE at an individual sampling site.

Summary

The 2017 data suggest that bull trout are in a **high risk** to **moderate risk** state when compared to provincial FSI standards. To ensure the long-term sustainability of the bull trout population and fishery, conservation-based management remains necessary.

Literature cited

Alberta Biodiversity Monitoring Institute and Alberta Sustainable Resource Development (ABMI and ASRD). 2014. Fish Survey Methods for Rivers: ABMI and ASRD Collaboration. Written by Jim Schiek and edited by M.G. Sullivan. Prepared for Alberta Biodiversity Monitoring Institute and Alberta Sustainable Resource Development. 20 pp.

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