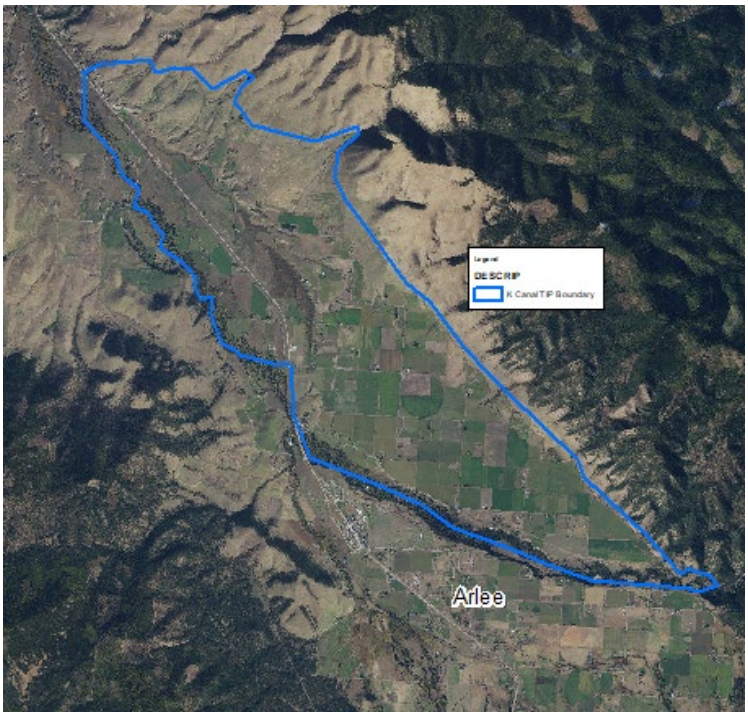
Targeted Implementation Plan
Lake County Montana
2023-2025

Natural Resources Conservation Service
Montana—FY2023 TIP Proposal

K-Canal Irrigation Project



Boundary of the proposed Jocko K-Canal Irrigation Project TIP

BEN MONTGOMERY
RONAN FIELD OFFICE

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Project Summary

In 2020, a collaboratively developed water rights agreement among the Confederated Salish and Kootenai Tribes (CSKT), the State of Montana, and the United States government was signed into law. The Montana Water Rights Protection Act, commonly referred to as "the Water Compact," provides funding for the rehabilitation of the century-old infrastructure of the Flathead Indian Irrigation Project (FIIP). One of the first systems slated for rehabillitation is the Jocko K-Canal near Arlee, Montana. The FIIP will be updating and repairing infrastructure and converting much of the existing open-ditch canal and lateral systems to enclosed pipelines, allowing for gravity pressurized delivery to many irrigators in this area. Planned modernizations for the Jocko K-Canal Unit will be focused on water delivery and will not include on-farm improvements for individual irrigators. This Targeted Implementation Plan (TIP) proposes to complement the planned improvements to the delivery infrastructure by providing financial and technical assistance for on-farm improvements. The primary resource concern that will be addressed through this TIP is improving irrigation efficiency (Inefficient irrigation water use). Reduced energy usage (Energy efficiency of equipment and supplies) and plant productivity and health are the secondary resource concerns that will be addressed. This will be accomplished by converting existing flood irrigation to pivot systems, replacing existing wheel line or hand line with low-pressure pivot sprinklers, and reducing the horsepower of existing pumps or removing them entirely when needs can be met through gravity pressurized delivery. We expect this project will last for three years (2023 thru 2025) and cost approximately $2,185,600. Most importantly, partnering with CSKT and FIIP on this first improvement project will foster a close working relationship that will advance opportunities for other, larger projects in the future as infrastructure improvements occur in the remaining areas included in the Water Compact. We view the K-Canal Unit Modernization as a stepping-stone on the path to many future projects.

Overview and Background Information

In December 2020, President Trump signed the 'Montana Water Rights Protection Act' (MWRPA), paving way for the implementation of the Confederated Salish and Kootenai Water Compact. This agreement, decades in the making, finalizes a long-running effort to negotiate an agreement that reconciles the CSKT's historic treaty rights related to water rights both on and off the Flathead Reservation. As part of the passage of the Water Compact, $1.9 billion dollars in federal funding has been allocated to CSKT, $900 million of which is to be used to administer and improve the FIIP over the next 10 years.

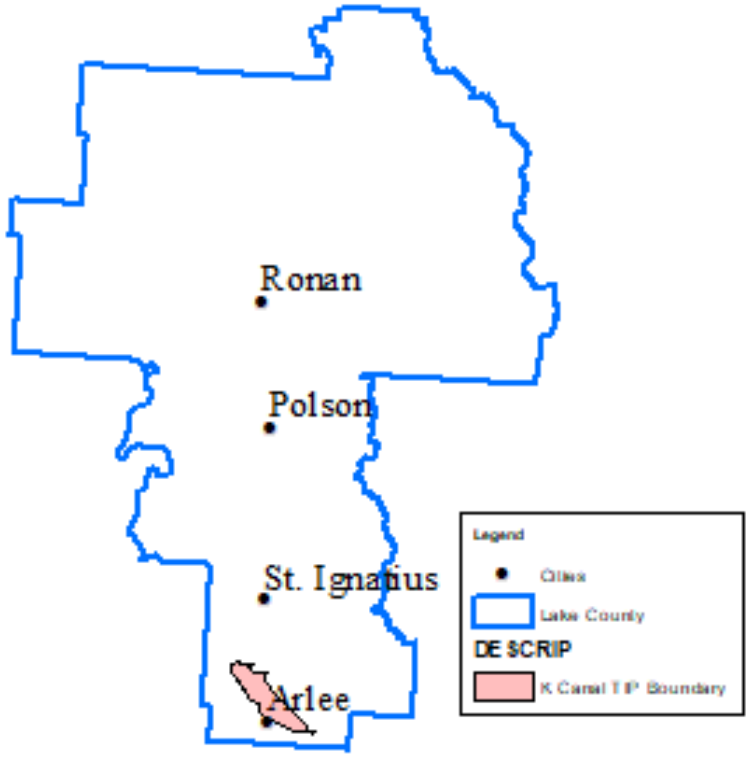

Figure 1. General project location within Lake County, Montana.

Irrigation is critical to the agricultural economy in Lake County. The Lake County Local Working Group (LWG) has prioritized irrigation improvement projects. The Lake County Long Range Plan outlines the importance of agriculture and irrigation to Lake County (Lake County Long Range Plan, pages 30, 32). The passage of the Compact provides an excellent opportunity for the NRCS and CSKT to work collaboratively thru Montana Focused Conservation (MFC) leveraging resources and partnerships to maximize the benefits of irrigation-related investments on the Flathead Reservation.

The FIIP was created to provide irrigation water to irrigable lands within the Flathead Indian Reservation. Construction on the complex project began in 1908, shortly after the reservation was opened to homesteading. The FIIP currently delivers irrigation water to 127,000 acres through a sprawling network of 15 reservoirs and dams, over 1,300 miles of canal and lateral ditches, and more than 10,000 minor irrigation structures within the Flathead Reservation (Voggesser, 2001). The FIIP serves as an important economic driver for Lake and Sanders Counties as well as for the Flathead Reservation which encompasses significant portions of both counties (Lake County Long Range Plan, p. 3).

The FIIP is in dire need of rehabilitation. Many parts of the system are over 100 years old. Aging infrastructure, leaking ditches and system failures during critical irrigation periods plague the FIIP staff and irrigators served by the project. In addition, because the system was largely designed and constructed over a century ago it does not reflect some of the opportunities presented by current technology. In 2016, the Cal Poly Irrigation Training and Research Center (ITRC) contracted with the Bureau of Indian Affairs to provide FIIP and CSKT a modernization plan for the FIIP (see Appendix C). This plan encompasses the entirety of the FIIP and outlines a vast number of physical improvements for FIIP as well as management recommendations (ITRC, 2017). According to the ITRC report, many locations within the FIIP service area

could benefit from conversion of open ditches to pipelines to facilitate gravity irrigation using low-pressure center pivot systems. In many locations, project employees struggle to provide water at the right times and quantities to meet the needs of sprinkler irrigation because the project was designed and installed prior to the advent of sprinkler irrigation technology. The ITRC report recommends adoption of technologies such as automated water controls, water regulation, on-demand pipelines, regulating reservoirs, and measurement devices which will lead to improved efficiencies and management of the project. This TIP will directly correlate with the recommendations outlined by ITRC. Coupling the ITRC recommended FIIP delivery-based improvements with on-farm irrigation improvements has the potential to transform irrigation and agricultural productivity on the reservation.

The modernization of the FIIP follow many of the recommendations outlined by the ITRC and will be overseen by CSKT. The implementation of improvements will be a decade-long, phased-approach effort involving hundreds of millions of federal funding and many area-specific projects, each 'large-scale'. It is currently anticipated that up to $90 million in federal funding will be provided to CSKT on an annual basis for ten years to be used to upgrade the FIIP. The first project that CSKT has prioritized is the Jocko Canal Unit Modernization. The Jocko Canal Unit is an isolated service area in the southern portion of the FIIP service area that supplies irrigation water to approximately 15,000 acres near the town of Arlee, Montana (Figure 2). The modernization calls for improving and automating irrigation flow controls and measurement, replacing miles of open-ditch delivery canals and laterals with on-demand gravity pipelines, and improving and properly configuring stream and river structures to maintain minimum stream flows while automatically maximizing diversions to maintain canal and pipeline capacities.

One of the primary components of the Jocko Canal Unit Modernization plan involves upgrading and improving the area serviced by the K-Canal, called the "K-Canal Modernization Project." K-Canal is an open-ditch canal and lateral group that services approximately 4,500 acres of irrigated lands directly north of Arlee (Figure 2 and Table 1). K-canal currently suffers from significant water loss by seepage through its gravelly soils with approximately 65-70% of soils in this project area consisting of gravelly loams according to the Web Soil Survey. According to CSKT's Irrigation Infrastructure Program Manager Jace Smith, "In some areas of the present (open canal) system it takes 6-acre feet of water at the headworks to get 1-acre foot of water on the irrigated land" (Azure 2021). The gravelly soils and lack of adequate infrastructure to accurately and efficiently deliver irrigation water makes it challenging to balance minimum in-stream flow requirements and irrigation needs.

Table 1: Irrigation types and acreage within project area.

Irrigation Type	Acres	% of Total Acres
Flood	983.2	21.8%
Wheel Line or Hand line	2,612.4	58%
Pivot	570.9	12.7%
No Designation	336.5	7.5%
Total	**4,503**	**100%**

The K-Canal Modernization Project will include construction of a new regulating reservoir and automated diversion with a fish screen to improve control of irrigation diversions and meet minimum in-stream flow requirements (Figure 3). Numerous open ditch laterals will be converted to an on-demand pipeline which will provide gravity benefits to water users – often eliminating the need for irrigation pumps entirely. CSKT'S planned modernizations for the Jocko Unit, including K-Canal Unit, will be focused on irrigation water delivery and will not include on-farm improvements for individual irrigators. Construction is slated to begin in the summer of 2022 at a cost of approximately $21 million. It is anticipated that the project will take four years to complete.

As shown in Figure 3, the K-Canal Unit provides irrigation water to approximately 4,500 acres of irrigated lands including 570 acres of pivots, 2,600 acres of wheel line and handline, and 980 acres of flood irrigation (Table 1). Crops grown are primarily forage-based including alfalfa hay, grass hay and pasture as well as several hundred acres in commercial sod production. Small grains such as wheat and barley are often grown during years when hay and pasture fields are being renovated for future replanting. Currently, very few of the K-Canal irrigators use gravity pipelines to irrigate. The conversion of much of the K-Canal Unit to on-demand pipeline will provide the opportunity for a significant portion of the irrigators within the service area to convert to full or partial gravity. Conversion to gravity irrigation will allow producers to reduce or eliminate irrigation pumping costs and energy usage. Energy, irrigation efficiency, and production increases could be further increased if irrigators upgrade their irrigation systems from flood to sprinkler or from handline or wheel line to pivot irrigation. Converting currently flood irrigated fields to sprinkler irrigation will significantly improve irrigation efficiency, often with very little energy usage if gravity benefits are realized. Coupling on-farm irrigation upgrades with the overall K-Canal modernization will also improve FIIP's ability to manage water through automated processes thus bringing the entire unit into a technologically advanced state of operation. Estimated energy savings have been calculated based upon typical scenarios for wheel line to pivot conversions and for flood to pivot scenarios and calculations were extrapolated based upon anticipated acres treated. These scenarios and calculations can be found in appendix A. Assumptions will be validated on select sites to ensure accuracy.

One of the primary benefits of the K-Canal Modernization plan will be to maximize the use and benefits of limited irrigation water supplies while improving in-stream flows within the Jocko River and the critical bull trout habitat it provides. Irrigators within the FIIP are provided annual irrigation water quotas based upon seasonal precipitation and snowpack levels. The K-Canal Modernization is not expected to increase or decrease these historical water quotas. Instead, most of the water savings realized by modernizing the delivery system will be used for in-stream flows. The investments of NRCS in on-farm improvements will allow agricultural producers to maximize the beneficial use of their irrigation water quotas and will further leverage both the irrigation and energy efficiency savings gained from CSKT's delivery improvements.

This TIP highlights the investment that the NRCS and CSKT are making in Montana Focused Conservation. *An important consideration with this TIP is the opportunity it will provide for the NRCS to build a stronger, more cohesive partnership with CSKT.* As stated previously, the Jocko Unit Modernization is the first of many large-scale irrigation improvement projects that will occur within the FIIP service area. Partnering on the K-Canal Unit will allow CSKT, FIIP and NRCS to form a closer working relationship and will advance opportunities for other, larger projects in the future. We view the K-Canal Unit Modernization as a stepping-stone on the path to many future projects. The Jocko K-Canal Unit Modernization is

just the first of many large-scale FIIP upgrades) - it is imperative that NRCS, through Montana Focused Conservation, immediately commit to working alongside CSKT as we advance goals set forth in the Water Compact.

This TIP will directly address the President and USDA's focus on developing climate smart agricultural strategies by investing in on-farm energy reductions through irrigation system upgrades and gravity irrigation improvements.

Flathead Indian Irrigation Project *Jocko Canal Unit Modernization*

K14 Loop Pipeline and K Canal Pipeline

Figure 18 shows the proposed K14 Loop and K Canal Pipelines.

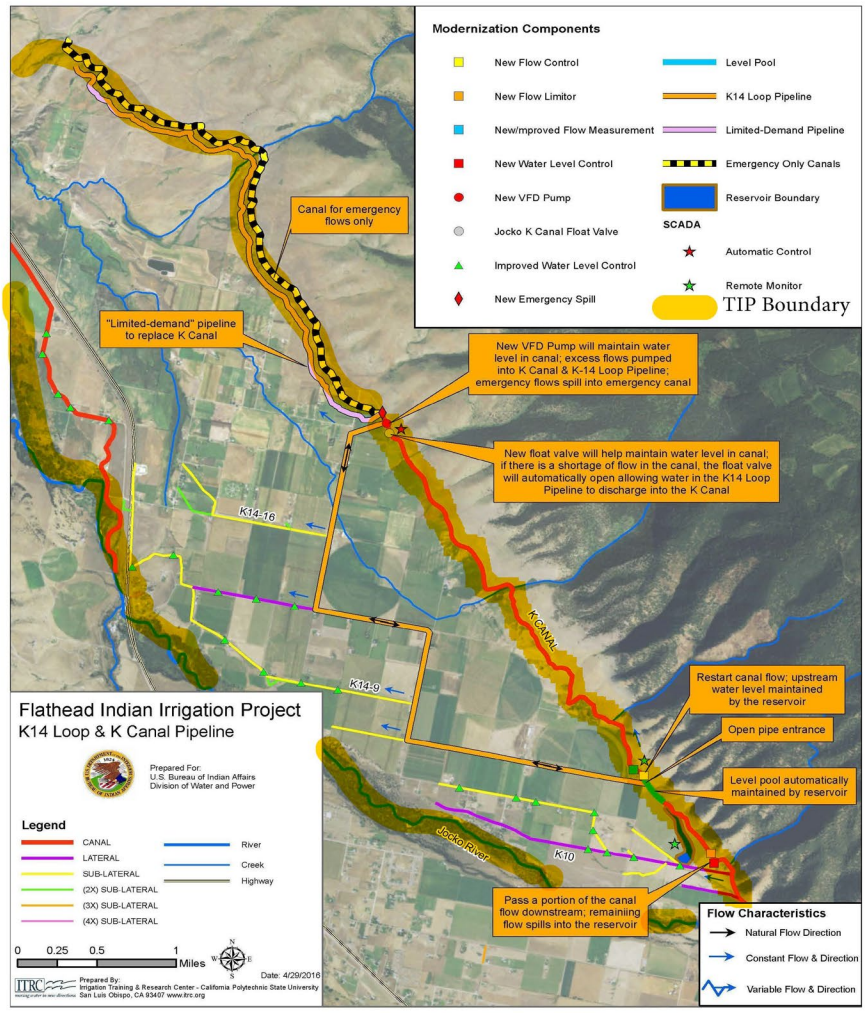

Figure 18. Proposed K14 Loop Pipeline and K Canal Pipeline

Irrigation Training and Research Center
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Figure 2. Proposed Pipeline Infrastructure for the K-Canal Service Area. (Irrigation Training and Research Center 2016). TIP boundary is highlighted in orange.

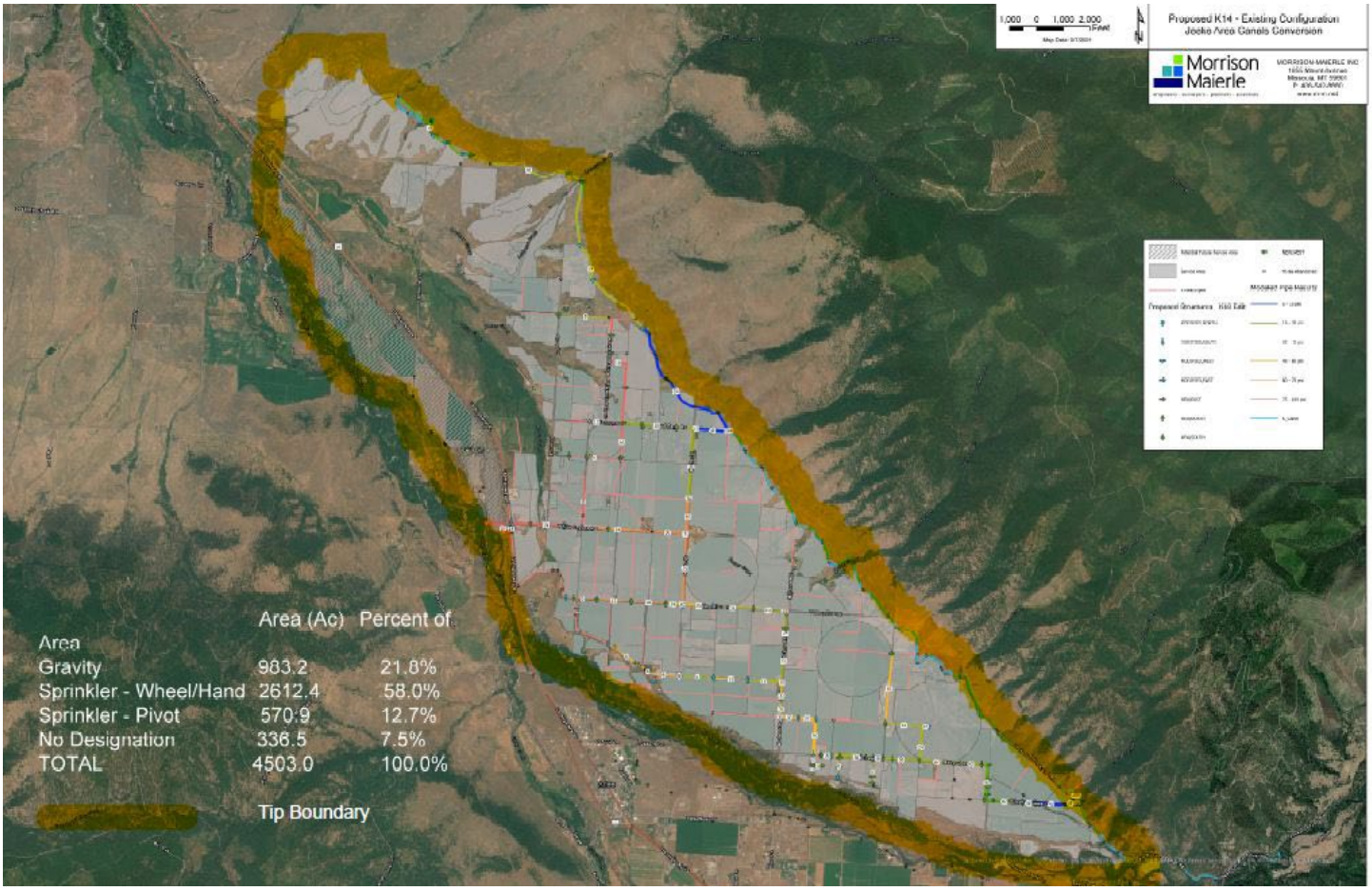

Figure 3. K-Canal Service Area and Irrigated Fields. TIP boundary highlighted in orange.

Goals and Objectives

The primary goals of this TIP are to improve on-farm irrigation efficiency, reduce energy usage, and improve crop production on irrigated lands within the boundaries of the K-Canal Modernization Project. It is anticipated that approximately 2,000 of the eligible 4,500 acres within the project area will be treated via this TIP. See Appendix A for anticipated typical cost scenarios and practices.

The primary resource concern that will be addressed through this TIP is improving irrigation efficiency (Inefficient irrigation water use). Reduced energy usage (Energy efficiency of equipment and supplies) and plant productivity and health are the secondary resource concerns that will be addressed.

Outcomes

- Utilization of Montana Focused Conservation to develop a unique partnership with CSKT and FIIP to assist in the implementation of the CSKT Water Compact.
- Development of outreach materials and news publications to highlight to value of partnerships and collaboration between the federal and local government, CSKT, BIA and the local agricultural community.
- It is anticipated that approximately 2,000 acres of the eligible 4,500 acres within the project area will be treated via this TIP. Typical field size within the project area is 80 acres and it is anticipated that approximately 25 projects will be completed.
- We expect the most common scenario will be converting existing wheel lines on an 80-acre field to a pivot sprinkler system. Because of the anticipated increase in gravity pressurization resulting from CSKT delivery system improvement and lower pressure requirements of pivot systems, we assumed this conversion would facilitate an average decrease in pump size from 40 HP to 10 HP.
- We expect approximately 2 projects that will convert an existing flood irrigated field to a pivot that is primarily gravity pressurized.
- Average total annual energy savings per project is anticipated to be 25,513 kWh (see energy calculations below)
- Total anticipated energy savings each year from all projects is anticipated to be 637,825 kWh

Energy Savings Calculations (table 2):

Scenario 1 – wheel line to pivot	kWh / day to operate	# of days to apply 12" to an 80-acre field	kWh / year to operate
Wheel line 40 HP pump	716.16	44	31,511 (31.5 MWh)
Pivot with 10 HP pump	179.04	33.5	5,998 (6 MWh)
Total annual savings / project			**25,513 (25.5 MWh)**

1 HP = 0.746 kW
40 HP pump uses (40 HP x 0.746 kW x 24 hours/day) = 716.16 kWh / day
10 HP pump uses (10 HP x 0.746 kW x 24 hours/day) = 179.04 kWh / day

Proposed Alternatives and Actions

1. Alternative 1: No action will occur. NRCS will not provide financial or technical assistance to improve irrigation efficiency and plant productivity and health and reduce energy usage on agricultural operations. Large-scale improvements made by CSKT on the K-Canal Modernization project will not provide as large of a benefit as could be realized if coordinated efforts to make on-farm improvements were completed.

2. Alternative 2: Selected Alternative. The selected alternative will be to utilize NRCS technical and financial assistance to improve irrigation and energy efficiency on agricultural lands within the project area. Practices will include irrigation sprinkler, irrigation pipeline, pumping plant, structure for water control, and irrigation water management (table 3) The project will last for three years (2023 thru 2025).

Eligible NRCS Conservation Practices (Code and Name)
442 – Irrigation Sprinkler System
430 – Irrigation Pipeline
533 – Pumping Plant
587 – Structure for Water Control
449 – Irrigation Water Management

3. Alternative 3: Assist with Irrigation Water Management by providing NRCS technical and financial assistance to improve the timing and application of irrigation water. Under this alterative NRCS would assist producer in monitoring soil moisture and timing irrigation applications to maximize the beneficial use of limited irrigation water supplies. Assistance to upgrade irrigation systems will not be provided.

Partnerships

The following partners will provide both direct and indirect assistance with this TIP:

- Confederated Salish and Kootenai Tribes (CSKT)
- Flathead Indian Irrigation Project (FIIP)
- Lake County Conservation District (LCCD)

LCCD and the Ronan Field Office have a longstanding partnership coordinating on conservation efforts. LCCD has also committed to investing in this project by hosting and promoting outreach events and communicating with producers interested in the EQIP program.

CSKT has been tasked with implementing the CSKT Water Compact. As part of this effort, approximately $90 million will be allocated each year for ten consecutive years. Significant investments will be made to modernize the entire Flathead Indian Irrigation Project. CSKT will focus their efforts primarily on delivery system improvements (canals, regulating reservoirs, water control structures). This TIP will be the first step in developing a long-term coordination strategy to couple CSKT delivery systems improvements with NRCS on-farm improvements.

Implementation

Table 4: Total Anticipated Acres/Year Enrolled in the TIP.

TIP Treatment Acres by Land Use	TOTAL	FY23	FY24	FY25
Acres of Pasture	**500**	100	200	200
Acres of Crop	**1500**	300	600	600

Table 5. NRCS Budget Projections, assume average cost of approximately $1,000/ac. See Appendix B for typical anticipated cost scenarios.

	FY23 Requested	FY24 Requested	FY25 Requested
Estimated FA	$400,000	$800,000	$800,000
Estimated Number of Contracts	5	10	10

Table 6. Anticipated Partner support provided.

Partners	Services, assets, or assistance provided
Lake County Conservation District	LCCD and the Ronan Field Office have had a longstanding partnership coordinating on conservation efforts. LCCD has also committed to investing in this project by hosting and promoting outreach events and communicating with producers interested in the EQIP program.
Confederated Salish and Kootenai Tribes (CSKT)	CSKT has been tasked with implementing the CSKT Water Compact. As part of this effort approximately $90 million will be allocated each year for ten consecutive years. Significant investments will be made to modernize the entire Flathead Irrigation Indian Project. CSKT will focus their efforts primarily on delivery system improvements (canals, regulating reservoirs, water control structures). This TIP will be the first step in developing a long-term coordination strategy and relationship to couple CSKT delivery systems improvements with NRCS on-farm improvements.

Area Office Engineering staff assistance will be requested with preliminary and final design and survey and construction inspections. Anticipated Area Office Engineering staff time for each project is 80 hours.

Potential Ranking Questions

1. Will this project result in conversion of the entire irrigated field from flood to sprinkler and will the irrigation system receive ≥75% of its pressure requirements from gravity irrigation?
2. Will this project include installation of a pivot and will pressure achieved through gravity provide ≥75% of the pressure requirements for the irrigation system on each field within this application?
3. Will this project result in a reduction of pump horsepower on the fields within the application of ≥75%?
4. Will this project convert an entire system to gravity and eliminate energy use/pump use entirely?

Progress Evaluation and Monitoring

Evaluation and monitoring will take place on an annual basis. NRCS and partners will analyze interest levels, implementation rates, and staff availability to plan and direct workloads. Each contracted practice will be overseen by field office staff with certifications being made upon completion, contingent on practices meeting NRCS standards and specifications. Progress will be recorded in Conservation Desktop or other appropriate databases.

One of the primary outcomes for this TIP is the expansion of partnerships with CSKT. With $90 million allocated for the CSKT Water Compact each year for ten consecutive years there exists a phenomenal opportunity to implement large-scale, long-term conservation projects within the Flathead Indian Irrigation Project's service areas. This project represents the proverbial 'tip of the iceberg' in terms of the scope and extent of potential projects. This TIP will strengthen existing partnerships with CSKT and allow both parties to build towards ever-larger, more complex projects in the future.

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Appendix A. Anticipated Funding Needs and Calculations- Based on 2022 EQIP Payment Schedule

Anticipated Funding Level: **$2,185,600**

Funding Assumption – Typical Practice Scenarios:

- HU payment rate, 80 acre pivot for average system, 10 HP pump, 2000' of 8" mainline, 8" flow meter
- 2,000 ac of irrigation improvements (flood to pivot or sprinkler to pivot)
- 20 pump replacements with 10 HP Pumps

Sprinkler Improvements Cost Estimates:

- 442 – HU Center Pivot >1200' = $567/ac x 80 ac = $45,360
- 533 – HU Pumping Plant, 10 HP = $498/hp x 10 hp = $4,980
- 430 – HU PVC Pipeline, 2000' = ~9,000 lbs x $3.10 = $27,900
- 587 – HU Mechanical Flow Meter, 8" = $136/inch x 8" = $1088
- 587 – HU Extra Small Structure = $4,089

Total = $83,417 $83,417/80 ac = **$1,043/ac**

$1,043/ac x 2,000 ac =$2,086,000

Pump Replacement Cost Estimates:

- 533 – HU Pumping Plant, 10 HP = $498/hp x 10 hp = $4,980
  - $4,980 x 20 projects = $**99,600**

Total Anticipated Funding Requirement: $2,086,000 + 99,600 = $2,185,600

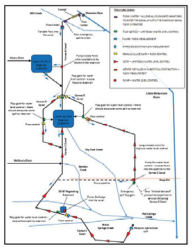
Appendix B

. Flathead Indian Irrigation Project Modernization Units. (ITRC 2017)

Modernization Goals By Unit

Hubbart Reservoir & Camas A Canal/Camas Canal Unit

- Maximized utilization of in-stream flows from Mill Creed to prolong storage in Hubbart Reservoir
- Simplified management of the canal unit
- Increased flexibility and reliability with water deliveries to farmers
- Recirculation of operational spills and farmer runoff

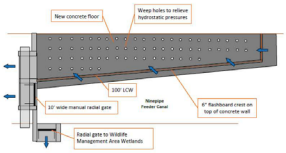


Valley View

- Improved flow and water level control
- New limited-demand pipeline
- Regulating reservoir construction
- Modifications to water level control structures
- New or improved flow measurement structures
- Incorporation of SCADA
- Vibratory compaction

Flathead Pumps & Polson Canals

- Improvements to Flathead River Pumps
- New pumpback system in Pablo Feeder Canal
- Conversion of canals with limited-demand pipelines
- Improved flow measurement and control
- New SCADA sites

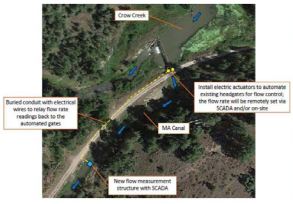


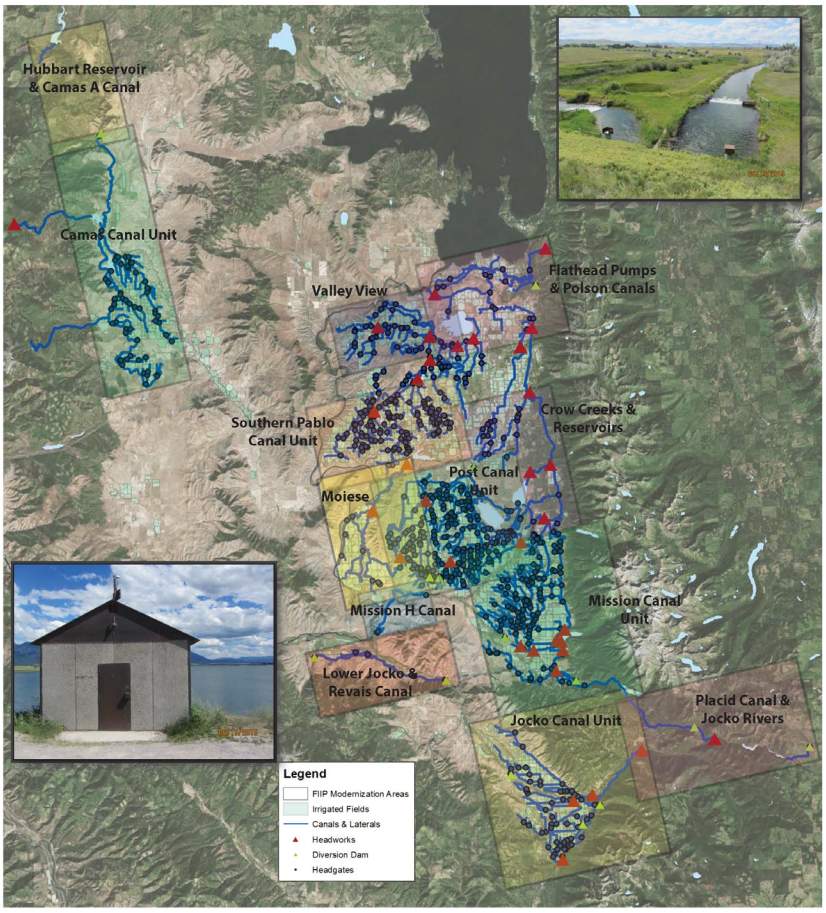
Crow Creeks & Reservoirs

- Control improvements at creek crossings
- Control changes at feeder canals that supply Kicking Horse Reservoir
- Increased canal capacity
- Upgraded pump station at Crow Creek
- Mutliple new or improved flow measurement sites
- Improved water level control
- Incorporation of SCADA

Southern Pablo Canal Unit

- Capture and re-regulation of excess flows
- Improved utilization of Horte Reservoir as a regulating reservoir
- Improved ease of operation and flexibility of water deliveries to fields
- Significant reduction of operational spills



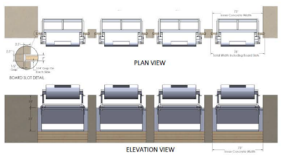


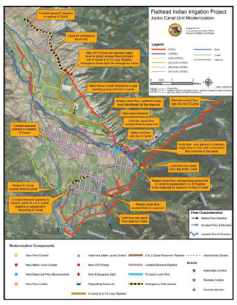
Post Canal Unit

- Improved spill sites
- Improved flow control and measurement
- Improved water level control
- Regulating reservoirs
- Conversion of laterals to limited-demand pipelines
- Incoporation of SCADA

Moiese

- Automated headgates
- Cleaned, expanded, and vibratory compacted canal sections
- Converstion to limited-demand pipelines
- Incorporation of SCADA





Mission Canal Unit

- Improved flow control & measurement
- Control changes to keep variable flows in the canal
- Physical modifications to canal subsystems
- Improved water level control and spill measurement
- New SCADA sites

Placid Canal & Jocko Rivers

- Improved flow control & measurement
- Vibratory compaction to decrease seepage
- New SCADA sites

Mission H Canal

- Improved safety and eased management of the canal system
- Reduced diversions from the river
- Improved water delivery service to farmers

Lower Jocko & Revais Canal

- Improved flow measurement
- Increased pump flow to meet irrigation demands
- Improved water level control
- Eased management and operations

Jocko Canal Unit

- Buffer reservoirs along K and J canals
- Division and "restarting" of long canals
- Replacement of miles of small canals and laterals with pipelines
- Improved and newly configured stream and river structures to maintain minimum instream flow rates

ITRC moving water in new directions
April 2017