Intake Diversion Dam Modification
Lower Yellowstone Project
Waters of the U.S. Delineation Report

U.S. Army Corps of Engineers – Omaha District

Planning, Programs and Project Management Division
Regulatory Field Support Section
Montana Regulatory Field Office

September 2012

Introduction

A bypass channel to accommodate fish passage around an irrigation intake dam on the Yellowstone River is proposed to be constructed as a part of the preferred alternative outlined in the *Intake Diversion Dam Modification, Lower Yellowstone Project, Supplemental Environmental Assessment* (EA). To assess potential impacts to regulated wetlands and waterways (waters of the U.S. or WUS) a determination and delineation was completed on August 16 and 17, 2012. Three areas were evaluated for potential WUS: a waste pile site (Area 1), construction limits of the proposed bypass channel (Area 2) and a nearby quarry (Area 3). A general description of the investigation area and anticipated impacts along with a more detailed description of findings are provided below.

Methods

Soil survey maps, topographic maps, National Wetland Inventory (NWI) maps, aerial photos and the Montana Natural Heritage maps were used to conduct a preliminary desktop investigation to locate highly probably locations of wetlands and waterways. ArcMap shapefiles of these features were loaded into a Trimble Global Positioning System (GPS). Hard copies of these maps were also taken into the field to cross-reference GPS shots to ensure the accurate recording of observations.

All three areas listed in the introduction were investigated during the site visit. Sample points were placed within areas that were identified during the desktop investigation to determine if features were WUS. Photographic stations were placed to document overall site conditions. Wetland and waterway boundaries were determined using routine methodologies and categorized according to the Cowardin Classification System (Cowardin et al., 1979). All project features were surveyed using a GPS unit and post-processed for sub-meter accuracy. A small scale delineation map is presented in Attachment 1 and a list of recorded vegetation and wetland indicator status are provided in Attachment 2.

Area 1: Waste Pile Site

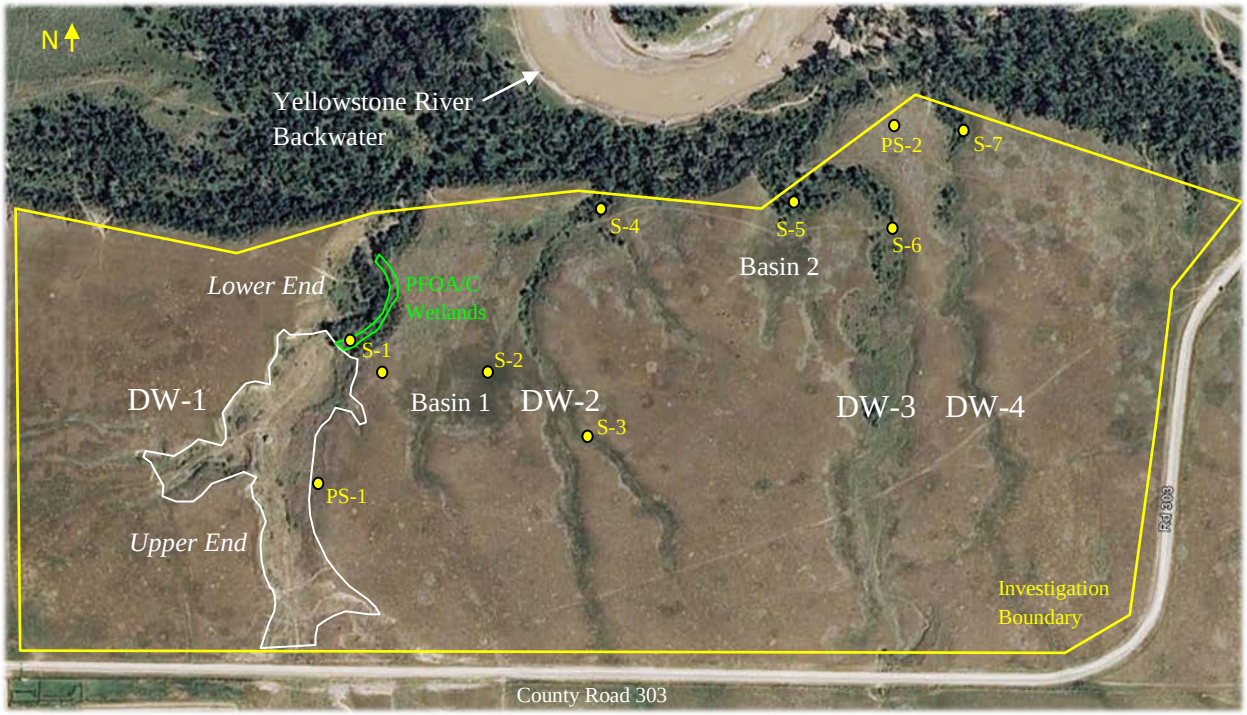


Figure 1. Waste pile site

Excess material from the excavation of the bypass channel would be displaced at this location. Up to 1.2 million cubic yards of material would cover 22 acres and create a 40-foot high artificial hill that would be shaped to blend in with the surrounding topography. Currently, the area is generally flat and dissected by four drainageways that convey water northerly during precipitation events until reaching a backwater of the Yellowstone River. See Figure 1 for a map identifying the investigation boundary, drainageways, photo stations, sample points and approximate wetland boundaries. See Map in Attachment 1 for the relationship of the waste pile site with other project areas.

Drainageway 1 (DW-1)

DW-1 was an incised drainageway with moderately steep banks located near the western boundary of the Waste Pile Site. A majority of DW-1 was dry at the time of investigation. DW-1 appears to drain areas south of County Road 303, collect overland flow and convey direct precipitation into the backwater of the Yellowstone River. DW-1 is described below in two sections, the upper end and the lower end. The upper end did not contain any wetlands and no evidence of an ordinary high water mark (OHWM) was present. See Photographs 1 and 2 for views of this area. Recorded upland species are listed in Table 1 below.

Table 1. Species identified in the upper end of DW-1

*Symphoricarpos albus** (common snowberry)	*Elymus virginicus* (Virginia wildrye)
Grindelia squarrosa (curlycup gumweed)	*Euphorbia esula* (leafy spurge)
*Artemisia cana** (silver sagebrush)	*Bromus japonicus* (Japanese brome)
*Artemisia tridentata** (big sagebrush)	

*Woody species

Photograph 1 – View from Photo Station 1 (PS-1) facing west showing upper end of DW- (south)

Photograph 2 – View from west of PS-1 from within DW-1 facing upstream

The lower end of DW-1 begins at the southern edge of a forested canopy where a seepage spring emerges from the hillside. See Photograph 3 for view of Sample point 1 (S-1), spring and wetlands (green line). The spring creates a narrow stream with gravel substrate that is approximately one- to four-inches deep and six-inches to five-feet wide. The stream flows in a northerly direction for approximately 325 feet until it dissipates and could no longer be observed. An OHWM was present near the current flow elevation.

Emergent wetlands formed a band from two inches to six feet wide around the stream. The wetlands transition to uplands where the stream dissipates. Hydrophytic trees dominate the overstory above the stream and herbaceous wetlands. Approximately 0.12 acres of Palustrine Forested Temporarily to Seasonally Flooded (PFOA/C) wetlands were surveyed at this location and are shown in green in Figure 1. See Photographs 3, 4 and 5 for views of this area. Recorded vegetation species are listed in Table 2 below.

Photograph 3 – View of S-1 and spring within lower end of DW-1 facing southwest

Table 2. Species identified in the lower end of DW-1

Eleocharis spp. (spikerush)	*Scirpus pungens* (sharp bulrush)	*Polypogon monspeliensis* (rabbitfoot polypogon)
Elymus spp. (wildrye)	*Calamagrostis canadensis* (blue-joint reedgrass)	*Ranunculus* spp. (buttercup)
Juncus dudleyi (Dudley's rush)	*Lycopus americanus* (American bugleweed)	*Eriogonum* spp. (buckwheat)
Polygonum spp. (smartweed)	*Conyza canadensis* (horseweed)	*Mentha arvensis* (wild mint)
Artemisia ludoviciana (prairie sagewort or white sagebrush)	*Trifolium* spp. (clover)	*Salix amygdaloides** (peach-leaf willow)
Fraxinus pennsylvanica (green ash)	*Ulmus Americana** (American elm)	*Populus deltoides** (Great Plains cottonwood)
Juniperus spp. (juniper)		

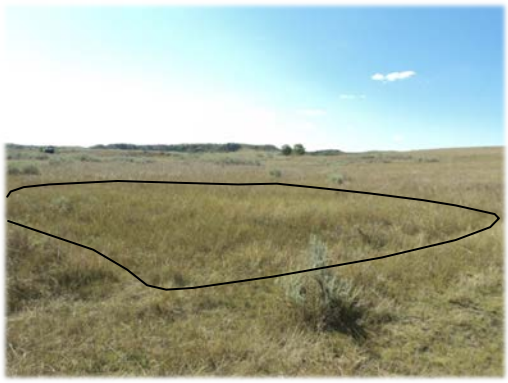
*Woody Species

Photograph 4 – View of area where stream and wetlands transition to upland area facing southwest

Photograph 5 – View of upland area where stream and wetlands end facing north

Basin 1 (B-1)

A lower flat area (B-1) between the upper ends of the banks of DW-1 and DW-2 appeared dark in a 2012 aerial photograph. Dark features on aerials may indicate wetness; therefore, a Sample point (S-2) was placed in the area to document observations. Conditions were very dry and only upland plants were identified. See Figure 1 for S-2 location and Table 3 for recorded vegetation. See Photograph 6 for a depiction of B-1 (black line).



Photograph 6 – View from S-2 of B-1 facing north

Table 3. Species identified in B-1

Agropyron cristatum (crested wheatgrass – grazed)	*Bromus* spp. (brome)
*Artemisia tridentata** (big sagebrush)	*Artemisia cana** (silver sagebrush)

*Woody species

Drainageway 2 (DW-2)

North of County Road 303 DW-2 is a grassed drainageway with gently sloping banks located near the center of the waste pile site. Near the northern boundary of the investigation area it transitions into a forested drainageway until reaching the Yellowstone River backwater. All of DW-2 was dry at the time of investigation. Similar to DW-1, DW-2 appears to drain areas south of County Road 303, collect overland flow and convey direct precipitation into the backwater of the Yellowstone River. Two Sample points (S-3 and S-4) were placed to document observations within DW-2. No hydrophytic vegetation or OHWM was present in this area. See Figure 1 for S-3 and S-4 locations and Table 4 for recorded vegetation. See Photograph 7 and 8 for depiction of DW-2.

Table 4. Species identified in DW-2

*Populus deltoides** (Great Plains cottonwood)	*Symphoricarpos albus** (common snowberry)	*Agropyron cristatum* (crested wheatgrass – grazed)
Juniperus spp. (juniper)	*Achillea spp.* (yarrow)	

*Woody species

Photograph 7 – View from S-3 facing northwest showing DW-2

Photograph 8 – View near S-4 showing DW-2 facing northwest

Basin 2 (B-2)

A slightly lower flat area was located west of DW-3 and appeared dark in a 2012 aerial photograph. Dark features on aerials may indicate wetness; therefore, a Sample point (S-5) was placed in the area to document observations. Conditions were very dry and only upland plants were identified. See Figure 1 for S-5 location and Table 5 for recorded vegetation. See Photograph 9 for a depiction of B-2 (foreground from black line).

Photograph 9- View from S-5 of B-2 facing south

Table 5. Species identified in B-2

Agropyron cristatum (crested wheatgrass)	*Bromus* spp. (brome)
Stipa spartea (porcupine needlegrass)	*Artemisia tridentata** (big sagebrush)

*Woody Species

Drainageway 3 (DW-3)

DW-3 resembles DW-2. North of County Road 303 DW-3 is a grassed drainageway with gently sloping banks located in the eastern half of the waste pile site. Near the northern boundary of the investigation area it transitions into a forested drainageway until reaching the Yellowstone River Backwater. All of DW-3 was dry at the time of investigation. It appears that DW-3 would collect overland flow and convey direct precipitation into the backwater of the Yellowstone River. Sample point 6 (S-6) was placed to document observations within DW-3. No hydrophytic vegetation or OHWM was present in this area. See Figure 1 for the location of S-6 and Table 6 for recorded vegetation. See Photograph 10 and 11 for a depiction of DW-3.

Table 6. Species observed in DW-3

*Artemisia tridentata** (big sagebrush)	*Symphoricarpos albus** (common snowberry)	*Agropyron cristatum* (crested wheatgrass – grazed)
Artemisia cana (silver sagebrush)	*Achillea* spp. (yarrow)	*Acer negundo** (box-elder)
Bouteloua gracilis (blue gramma)	*Stipa spartea* (porcupine needlegrass)	

*Woody species

Photograph 10 - View where DW-3 transitions from grassed to forested drainageway facing north

Photograph 11 - View from south of S-5 facing north showing DW-3

Drainageway 4 (DW-4)

Similar to the other drainageways, DW-4 transitions from a grassed drainageway with gently sloping banks into a forested drainageway with steeper banks that connects to a backwater of the Yellowstone River. All of DW-4 was dry at the time of investigation. It appears that DW-4 would collect overland flow and convey direct precipitation into the backwater of the Yellowstone River. Sample point 7 (S-7) was placed to document observations within DW-3. *Populus deltoides* (Great Plains cottonwood) is a facultative tree (50% likelihood of being in a wetland) but was not the dominant vegetation within DW-4. No other hydrophytic species or OHWM was present in this area. See Figure 1 for the location of S-7 and Table 7 for recorded vegetation. See Photograph 12 for a depiction of DW-3 and Photograph 13 for a view from Photo Station 2 (PS-2) showing the steep drop off east of S-7 outside of the investigation limits.

Table 7. Species identified in DW-4

*Populus deltoides** (Great Plains cottonwood)	*Symphoricarpos albus** (common snowberry)	*Juniperus spp.* (juniper)
Agropyron cristatum (crested wheatgrass – grazed)	*Achillea* spp. (yarrow)	

*Woody species

Photograph 12 - View showing S-7 facing northwest

Photograph 13 - View from PS-2 facing north showing steep drop off outside investigation area

Avoidance and minimization of impacts

One wetland and a spring with a waterway that did not have a continuous OHWM were identified at the Waste Pile Site. Although a continuous OHWM was not observed, these features are likely regulated WUS as they connect directly to the Yellowstone River and should be avoided as a place to dump fill material. Additionally, areas within the banks of all drainageways should be avoided to the maximum extent possible. If fill must be placed in the drainageways, it should be placed in the headwaters as these areas are the flattest and fill here would most blend in with the surrounding topography. Culvert extensions would be needed if fill were placed in drainageway headwaters near the south boundary of the waste pile site so as to not hinder drainage from areas south of County Road 330.

Area 2 – Construction limits of the bypass channel and improved access roads on Joe's Island

Joe's Island is essentially flat with some low areas and historical meander scars dissecting the landscape. The excavation of a bypass channel would begin just east of the existing Intake Dam on the right descending bank of the Yellowstone River and would traverse southerly along a historic meander scar until reaching an existing backwater. The excavation of 1.2 million cubic yards of earthen material would be disposed of at the waste pile site (Area 1). A new access road would be constructed directly east of the proposed bypass alignment. This new road would tie into existing access roads that may need to be improved to accommodate heavy machinery traffic. More details related to construction can be found in Chapter 2 of the EA. See Figure 2 for a map identifying the investigation boundary, drainageways, photo stations, sample points and wetland approximate wetland boundaries. See Map 1 in Attachment A for the relationship of the waste pile site with other project areas.

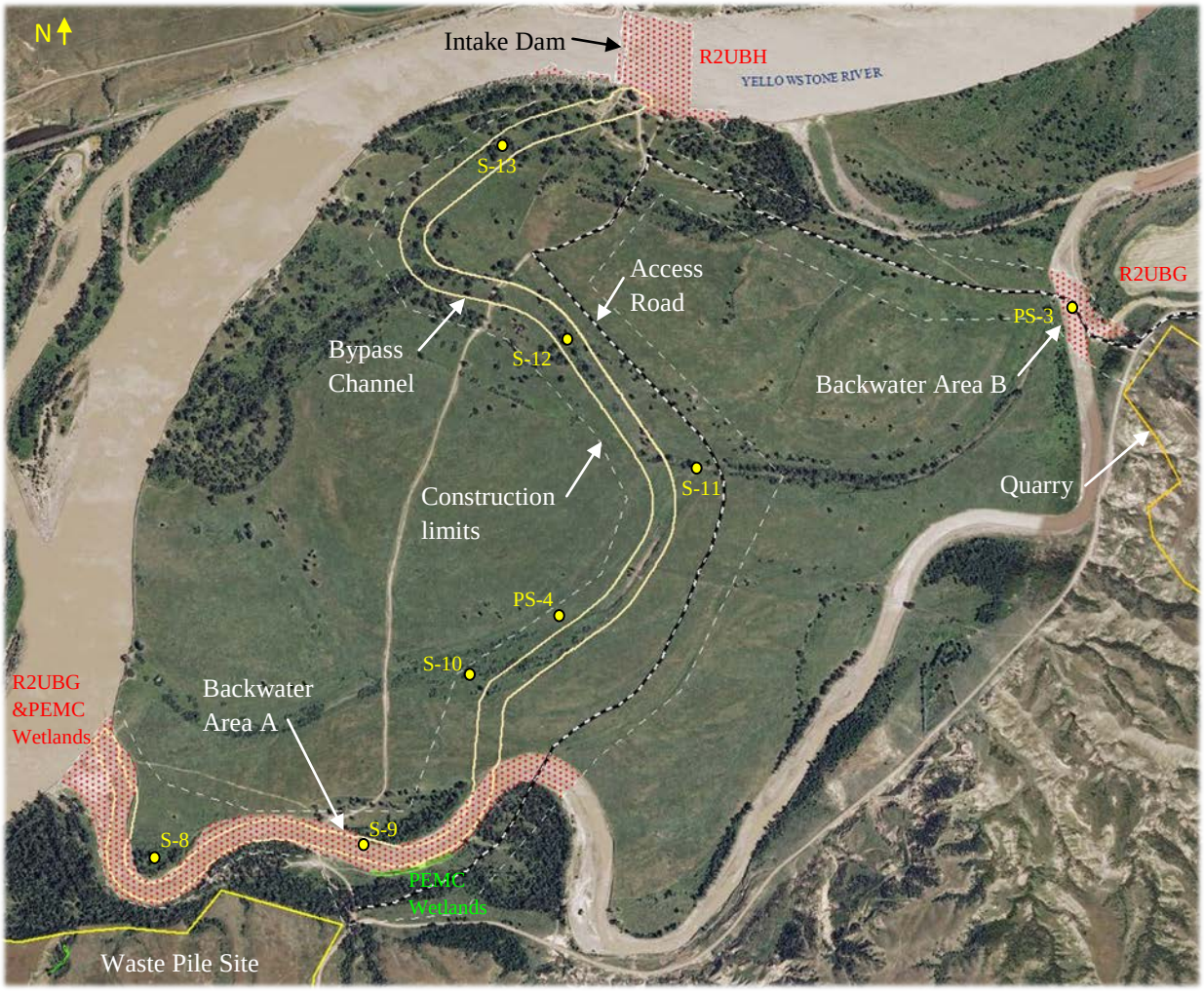


Figure 2. Joe's Island

Backwater areas, meander scars, NWI polygons, Montana Heritage Program habitat polygons and other areas that may have indicated wetness on aerial photographs were investigated on Joe's Island for

potential wetlands or waterways. Four major communities were observed: backwater channels containing fringe wetlands on sand and gravel bars, cottonwood gallery forests, sagebrush and crested wheatgrass shrubland community and the Yellowstone River.

Backwater channels

Backwater Area A – The NWI map classifies this area as Riverine Lower Perennial Unconsolidated Bottom Intermittently exposed (R2UBG) channel backwater. See Figure 2 for backwater location. The OHWM appeared to be along the banks as indicated by the yellow line in Photograph 14. Flow was imperceptible and the backwater appeared to be stagnant at the time of the investigation. Rock and gravel bars were present throughout the banks of the channel. Bands of fringe wetlands lie adjacent to the channel and are represented by seasonal to semi-permanent herbaceous vegetation. Observations recorded at Sample point 9 (S-9) are presented in Table 8. See Photos 14 and 15 for depictions of Backwater Area A. A narrow two- to four-foot side channel was dominated by wetland vegetation and likely conveys water during high flows and functions as a wetland swale when flows are low. See green boundary line in Photo 16 for a view of this wetland swale.

Photograph 14 – View of Backwater Area A from north of S-9 facing south

The palustrine emergent seasonally flooded (PEMC) wetlands likely fluctuate in size every year based on flow through the backwater channel. All areas have a direct connection to the Yellowstone River. Areas within the investigation area in Backwater Area A that are R2UBG and/or PEMC wetlands measure approximately 45 acres in size and are pixilated red on Figure 2. The side channel contained approximately 0.40 acres of PEMC wetlands and is shown in green on Figure 2.

Table 8. Species observed in Backwater A

Scirpus pungens (sharp bulrush)	*Salix exigua** (sandbar willow)	*Carex* spp. (sedge)
Echinochloa crusgalli (barnyard grass)	*Equisetum* spp. (horsetail)	*Potentilla anserina* (silverweed cinquefoil)

Photograph 15 - View from S-9 showing Backwater Area A facing west

Photograph 16 – View of wetland swale from south of S-9 facing east

Backwater Area B – The NWI map classifies this area as Riverine Lower Perennial Unconsolidated Bottom Intermittently Exposed (R2UBG) channel backwater. See Figure 2 for backwater location. At the time of investigation there was very little vegetation within the area where an existing road would be improved to accommodate heavy machinery traffic. No vegetative species were recorded at Sample point 14 (S-14). Flow in the backwater was imperceptible and appeared to be stagnant. Sand and gravel were present adjacent to the open water areas. Backwater Area B connects directly to the Yellowstone River and contained approximately six acres of R2UBG habitat. See Photographs 17 and 18 below for depictions of this area.

Photograph 17 - View of Backwater Area B from Photo Station 3 (PS-3) facing southeast

Photograph 18- View of Backwater Area B from PS-3 facing northwest

Avoidance and minimization of impacts

Backwater Area A contains wetlands and a waterway while Backwater Area B consisted of a waterway without wetlands. Both areas would be considered jurisdictional waters of the U.S. Fill should be avoided from being placed in these locations to the maximum extent practicable. If temporary fill is placed into either backwater, then the site should be restored to pre-disturbance conditions when the activity is completed. If either area is excavated, it is likely similar wetlands would develop along the banks following construction.

Cottonwood gallery forests

Sporadic cottonwood cover was present in patches across Joe's Island. *Populus deltoides* (Great Plains cottonwood) is a facultative tree (50% likelihood of being in a wetland) but was not the dominant vegetation within this community. Cottonwoods are approximately 75 feet tall with root systems likely as deep. These root systems probably penetrate through shallow groundwater systems which allow the cottonwoods to survive in an otherwise dry area. The understory of these areas contained upland shrubs, forbs and grasses. Leaf litter from previous growing seasons was present. See Table 9 for species identified in this area. Conditions were dry at the time of investigation. Several sample plots were placed throughout Joe's Island to document this community. Sample points S-8, S-11, S-12 and S-13 are depicted in Figure 2. No wetlands or waterways with an OHWM were identified in these areas. See Photographs 19 and 20 for typical views of the cottonwood gallery forested areas.

Table 9. Species identified in cottonwood gallery forests

*Populus deltoides** (Great Plains cottonwood)	*Symphoricarpos albus** (common snowberry)	*Elaeagnus angustifolia** (Russian olive)
Juniperus spp.* (juniper)	*Shepherdia argentea** (silver buffaloberry)	*Acer negundo** (box-elder)
Agropyron cristatum (crested wheatgrass)	*Euphorbia esula* (leafy spurge)	*Ambrosia spp.* (ragweed)
Grindelia squarrosa (curlycup gumweed)		

*Woody species

Photograph 19 – View of cottonwood gallery forests near S-9 facing north

Photograph 20 – View of cottonwood gallery forests near S-13 facing north

Avoidance and minimization of impacts

The removal of mature cottonwood trees along the proposed bypass channel should be avoided to the maximum extent practicable. Modifying the alignment slightly and/or incorporating the trees into the bypass channel would preserve a scarce habitat in Montana and should be given consideration during the final design.

<u>Sagebrush and crested wheatgrass shrubland</u>

A majority of Joe's Island is dominated by a sagebrush and crested wheatgrass shrubland community. Multiple species of sagebrush and buffaloberry dominate the shrub stratum while crested wheatgrass and leafy spurge dominate the herbaceous understory. Old meander scars and areas that looked dark on aerials were investigated for wetlands or waterways. See Table 10 for species recorded at Sample point 10 (S-10) for typical vegetation in this

Photograph 21 - Typical view of sagebrush and crested wheatgrass community from PS-4 facing north

community. Conditions were dry and no wetlands or waterways with an OHWM exist. See Photo 21 for a typical view from Photo Station 4 (PS-4) of this community type.

Table 10. Species identified in sagebrush and crested wheatgrass community

Agropyron cristatum (crested wheatgrass)	*Euphorbia esula* (leafy spurge)	*Grindelia squarrosa* (curlycup gumweed)
Ambrosia spp. (ragweed)	*Bromus japonicus* (Japanese brome)	*Pseudoroegneria spicata* (bluebunch wheatgrass)
*Symphoricarpos albus** (common snowberry)	*Shepherdia argentea** (silver buffaloberry)	*Artemisia tridentata** (big sagebrush)
*Artemisia cana** (silver sagebrush)	*Artemisia ludoviciana** (white sagebrush)	

*Woody species

Avoidance and minimization of impacts

The bypass channel would impact this community the most. Due to the availability of similar habitat on Joe's Island, the cumulative impacts to the environment would be minor. Construction of the project would increase floodplain connectivity and increase the habitat diversity as compared to the existing monotypic habitat community.

Yellowstone River

The NWI map classifies this area as a Riverine Lower Perennial Unconsolidated Bottom Permanently Flooded (R2UBH) channel. See Figure 2 for the location of the Yellowstone River. The banks ranged from steep to gradual and contained small patches of palustrine emergent seasonally flooded (PEMC) wetlands. The PEMC wetland acreage was estimated to be less than 0.05 acres and the area of potential disturbance to R2UBH river habitat is approximately one acre. See Table 11 for species identified along banks of the Yellowstone River and Photograph 22 for a panoramic view of this area.

Table 11. Species observed along banks of the Yellowstone River

Juncus dudleyi (Dudley's rush)	*Equisetum* spp. (horsetail)	*Elymus* spp. (wildrye)
Polygonum spp. (smartweed)	*Grindelia squarrosa* (curly-cup gumweed	

Photograph 22 - View of Intake Dam from right descending bank of the Yellowstone River facing north

Avoidance and minimization of impacts

The Yellowstone River is a waterway with small patches of emergent wetlands along the shoreline. Both habitats would be considered jurisdictional waters of the U.S. Fill should be avoided from being placed in these locations to the maximum extent practicable. If temporary or permanent fill is placed into the river, than environmental conditions should be restored to a pre-disturbed state when the activity is completed.

Area 3 – Quarry

The desktop investigation indicated that this area likely did not contain wetlands or waterways. The quarry is on private land and permission was not obtained prior to the investigation, so investigators could not verify desktop findings in the field. Excavating material from here for construction on Joe's Island and the Waste Pile Site should not impact any waters of the U.S. at this site. No avoidance or minimization techniques are recommended regarding sensitive habitats for Area 3. See Figure 3 for an aerial view of this location.

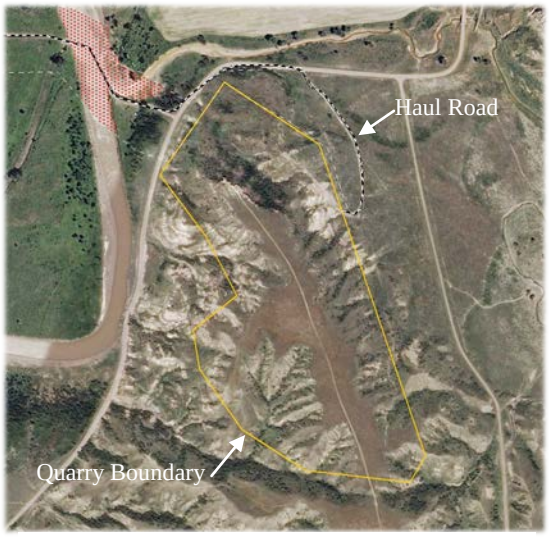


Figure 3. Quarry site

Conclusion

Waters of the U.S. were identified within Area 1 (waste pile site) and Area 2 (proposed bypass channel alignment and the Yellowstone River). No WUS were identified within Area 3 (Quarry). See Table 12 below for a list of type and quantity of wetlands or river/channel habitat identified during the investigation.

Fill disposed of at the waste pile site should be placed in the areas above the banks of the drainageways. If fill is placed near the southern boundary to construct a temporary construction haul road, culvert extensions should be used to keep areas south of County Road 303 draining north. All fill at the Waste Pile Site should be graded to match surrounding topography and to ensure that drainage resembles, as much as possible, pre-disturbance conditions. Topsoil from the excavated bypass channel should be stockpiled, placed at the top of the disbursed fill and seeded with a mix resembling pre-disturbance conditions. A recommended seed list is provided in Attachment 3.

Table 12. Total wetlands and river/channel habitat acreages

Cowardin classification	Approximate Acres
PFOA/C	0.12
PEMC	0.45
R2UBG	6.00
R2UBH	1.00
R2UBG/PEMC	45.00 acres

Coordination of Clean Water Act authorizations and their processes should be in consultation with the Corps' Omaha District Billings Regulatory Office. A review of the project features and channel alignment during the final design phase is recommended for a verification of authorizations required.

List of Preparers

Field work completed by Michael Gilbert (CENWO-OD-RF), Cathy Juhas (CENWO-OD-RMT) and John Shelman (CENWO-PM-AC)

Report completed by John Shelman

Reviewed and approved by Michael Gilbert and Cathy Juhas

References

Cowardin, L.M., V. Carter V., F.C. Golet, E.T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. U.S. Fish and Wildlife Service Report No. FWS/OBS/-79/31.Washington, D.C.

U.S. Army Corps of Engineers – Omaha District. 2012. Intake Diversion Dam Modification, Lower Yellowstone Project, Supplemental Environmental Assessment. Omaha, Nebraska