

From: [Fernandez, Juliette](#)
To: [Radke, Bill](#); [Harden, Tasha](#)
Subject: Can you look at this and adjust as necessary?
Date: Friday, February 14, 2020 9:45:47 AM
Attachments: [Hay Hollow Wash.docx](#)

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Fernandez, Juliette has shared a OneDrive for Business file with you. To view it, click the link below.



[Hay Hollow Wash.docx](#)

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I still need a pic of gabion 1 if you have one.

Juliette Fernandez
Refuge Supervisor AZ/NM

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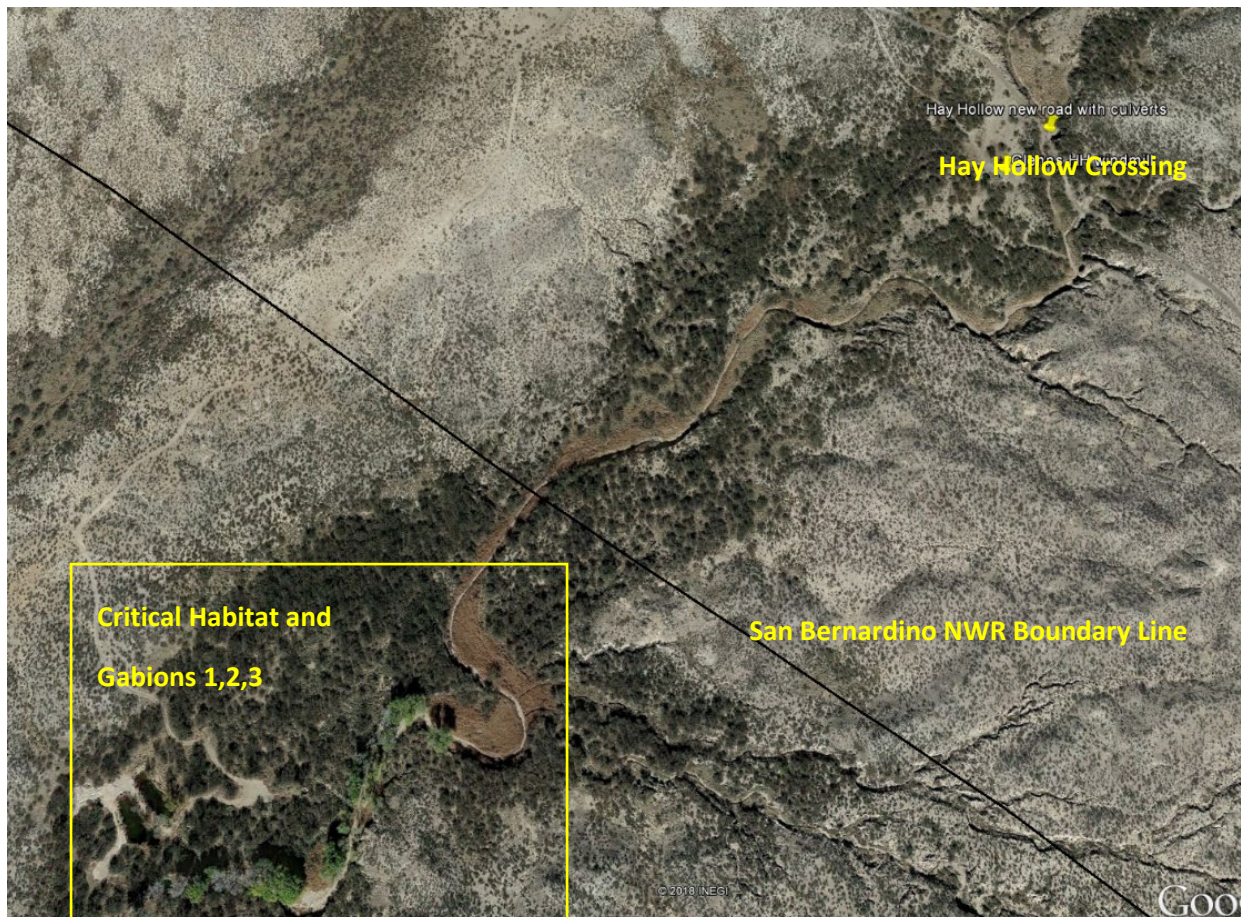
Hay Hollow Wash at San Bernardino National Wildlife Refuge

Hay Hollow Wash:

- Hay Hollow wash is one of two integral waterways on the refuge for providing passage and refugia for endangered fish and wildlife. The wash provides year-round pools, created by a combination of three erosion control structures called gabions, and overflow from two refuge ponds entering the wash.

Recent Events:

- Contractors built a culvert crossing on Glenn Ranch land immediately upstream from San Bernardino NWR to bridge Hay Hollow Wash (See map below).
- A November flood event, not unusual for Hay Hollow Wash during the summer and winter rainy seasons, mobilized and piled brush and other debris against the upstream end of the culverts - effectively damming the flow until the road crossing ultimately failed. (Picture 1)
- The resulting wall of water then travelled rapidly downstream and rushed refuge infrastructure.
- This damaged and/or washed out two refuge gabions (rock-filled wire-caged erosion control structures that have been in place for decades) and downcut the refuge stream bed by six feet, which will require repair.
- Additionally, the volume of silt mobilized by the sudden failure of the road crossing, combined with the erosive force of the wall of water coursing downstream, has filled in refuge wetlands (occupied critical habitat for endangered fish) in Hay Hollow Wash and impacted (eroded) known cultural resource sites.
- The road crossing and culverts were reconstructed mid-December. Adjustments included additional dirt and rip rap at the base. There has not yet been another flood event to test the strength of the new crossing. (Picture 2)





Picture 1. November 2019. Post flood event blow out of Hay Hollow Crossing



Picture 2. December 2019- New Hay Hollow Crossing

PICTURE OF GABION 1 PRE BLOW OUT

Construction finalized in 2009. Water held Yaqui chub, Yaqui topminnow and supported Huachuca water umbel.



Gabion 1 – January 2020. Gabion 1 persisted through the November 2019 flood event however large amounts of sediment filled the pool at the base. This pool had provided critical habitat for endangered fish for over a decade.



Gabion 2 – Year 2002. Gabion 2 ensured year-round water at its base which supported critical habitat for Yaqui chub , Yaqui topminnow, and Huachuca water umbel. Despite multiple flood events, this structure persisted until the Hay Hollow crossing failed upstream November 2019.



Gabion #2 – January 2020. Six feet of gabion wall fell during the flood event, washing sediment and rock downstream. It is no longer a functional gabion for future flood events.



Gabion 3 – March 2009. Photo taken looking north. The west side of the gabion is flush against the tall bank.



Gabion 3 – January 2020. Photo taken looking south. Due to the significant pulse of water released upstream, the bank on the west side of the gabion eroded significantly.

Recommended Action:

- Substantially fortify the Hay Hollow crossing.
- If a site visit is beneficial, the San Bernardino NWR staff will gladly provide details.