REPORTING APPS FOR THE PUBLIC

Bryce Maxell, MNHP

MISC
Montana Invasive Species Council

Applications to Report Non-native Species Data: the importance of passive surveillance to early detection and rapid response

Bryce Maxell – Program Coordinator, Montana Natural Heritage Program

MONTANA STATE LIBRARY
NATURAL HERITAGE PROGRAM

Status of Invasive Species Information

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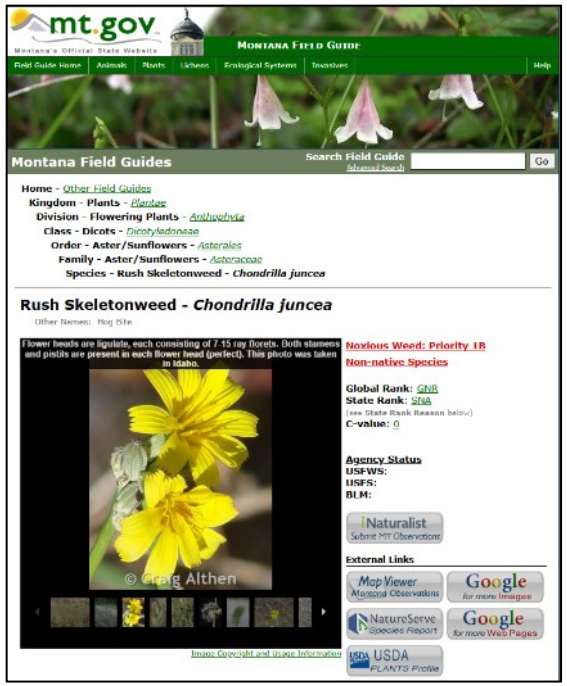
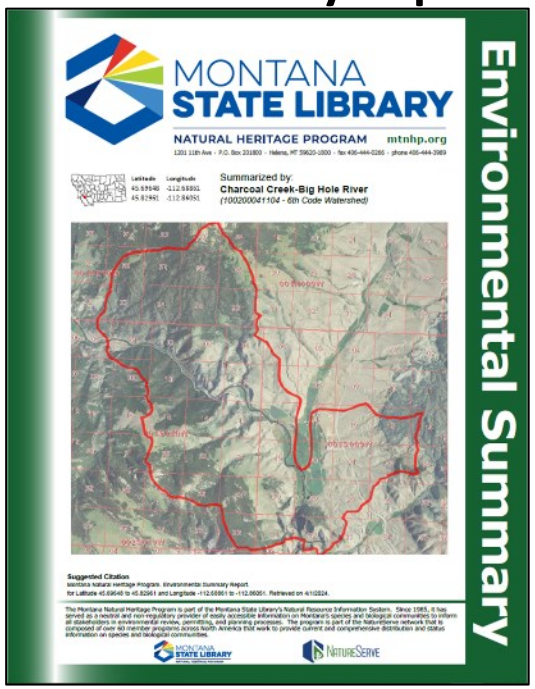
- 1,330 non-native species present or potential to establish
- ~1,000,000 observations (3/4 are plants)
- 150,921 structured surveys
- >1,250 data sources
- Predicted invasion risk models for 149 invasives
- Quarterly emailed audit reports of new weed records
- AGOL feature services for use in GIS
- Weed Dashboard
- iNaturalist Non-native Species Watch List

Montana Field Guide



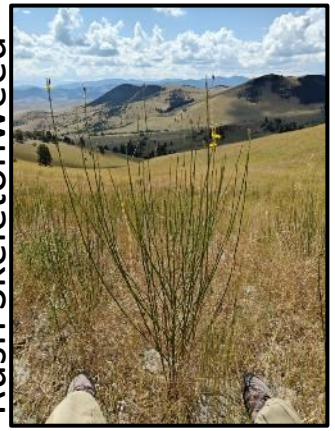
Enviro Summary Reports



Early Detection Rapid Response Successes!

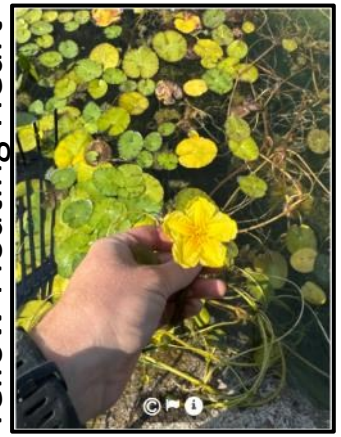
Palmer's Amaranth

Rush Skeletonweed

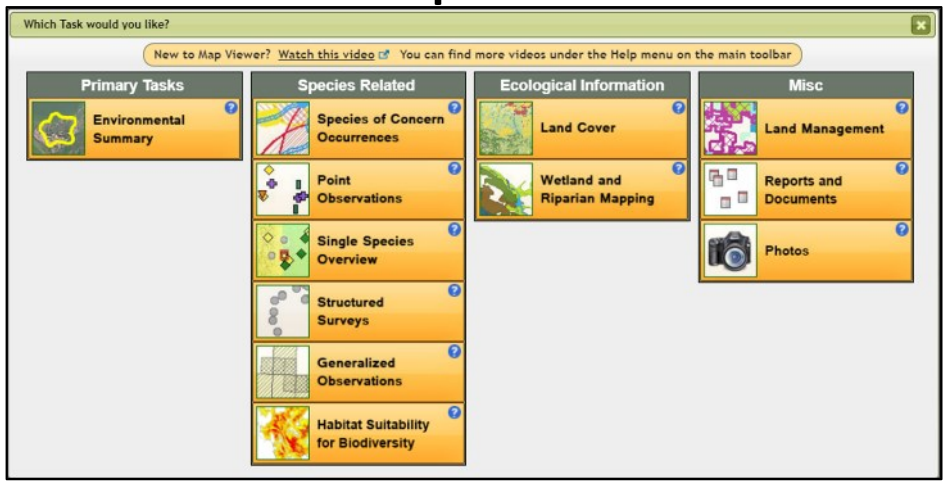


Escargot

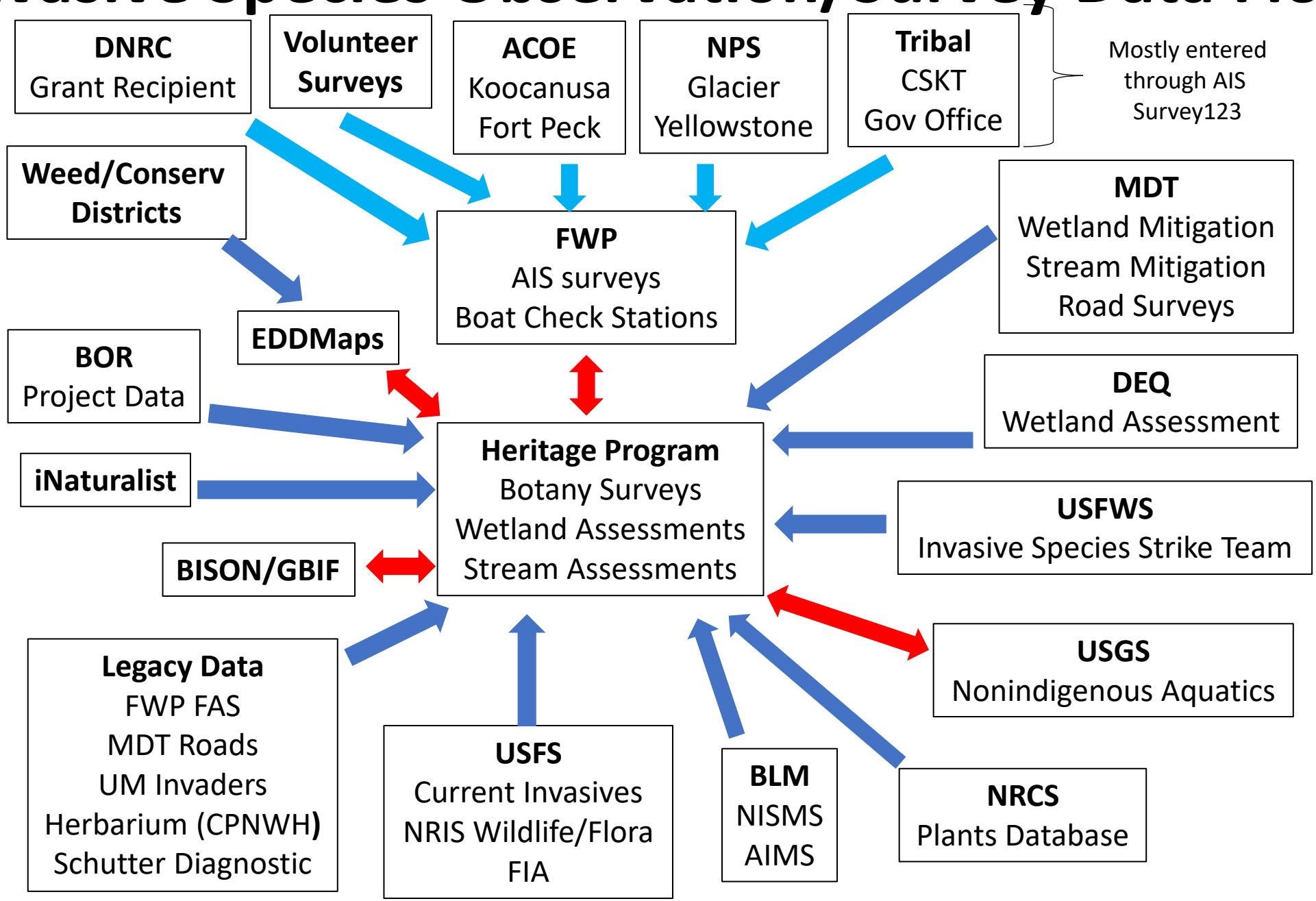
Yellow Floating Heart



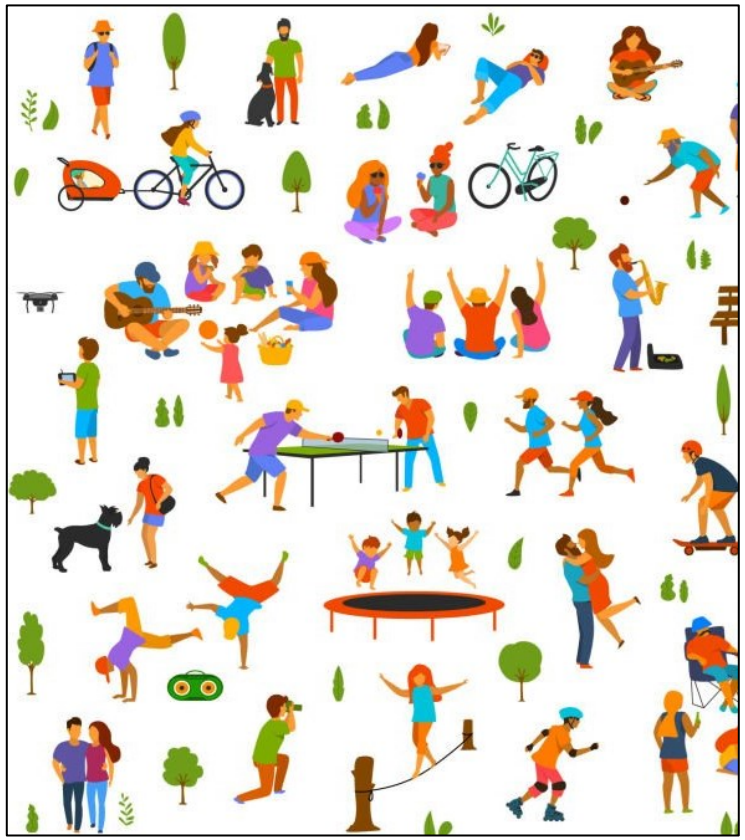
Map Viewer



Invasive Species Observation/Survey Data Flow



Possibilities for Early Detection & Rapid Response (EDRR) have never been better!



Survey123 for ArcGIS

iNaturalist

SQUEAL ON PIGS!

WILD SPOTTER

EDDMapS Early Detection & Distribution Mapping System

Pl@ntNet

Observation.org

ObsIdentify

iObs

ObsMapp

eBird

FieldSeeker

REPORT INVASIVE

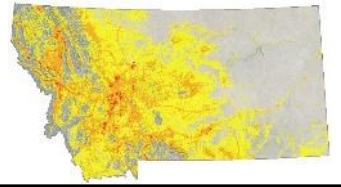
Application Program Interfaces

iNaturalist

Databases

Microsoft SQL Server Management

Invasion Risk Models



Online Maps/Tools

ArcGIS Online

Numbers of Observations in Montana

FWP AIS Survey123 Data = 21,293 (3,602 non-native plants & 1,654 non-native animals

MTNHP Survey123 Data = 13,029 (419 non-native plants & 235 non-native animals)

= 19,127 (18,337 non-native plants & 790 non-native animals)

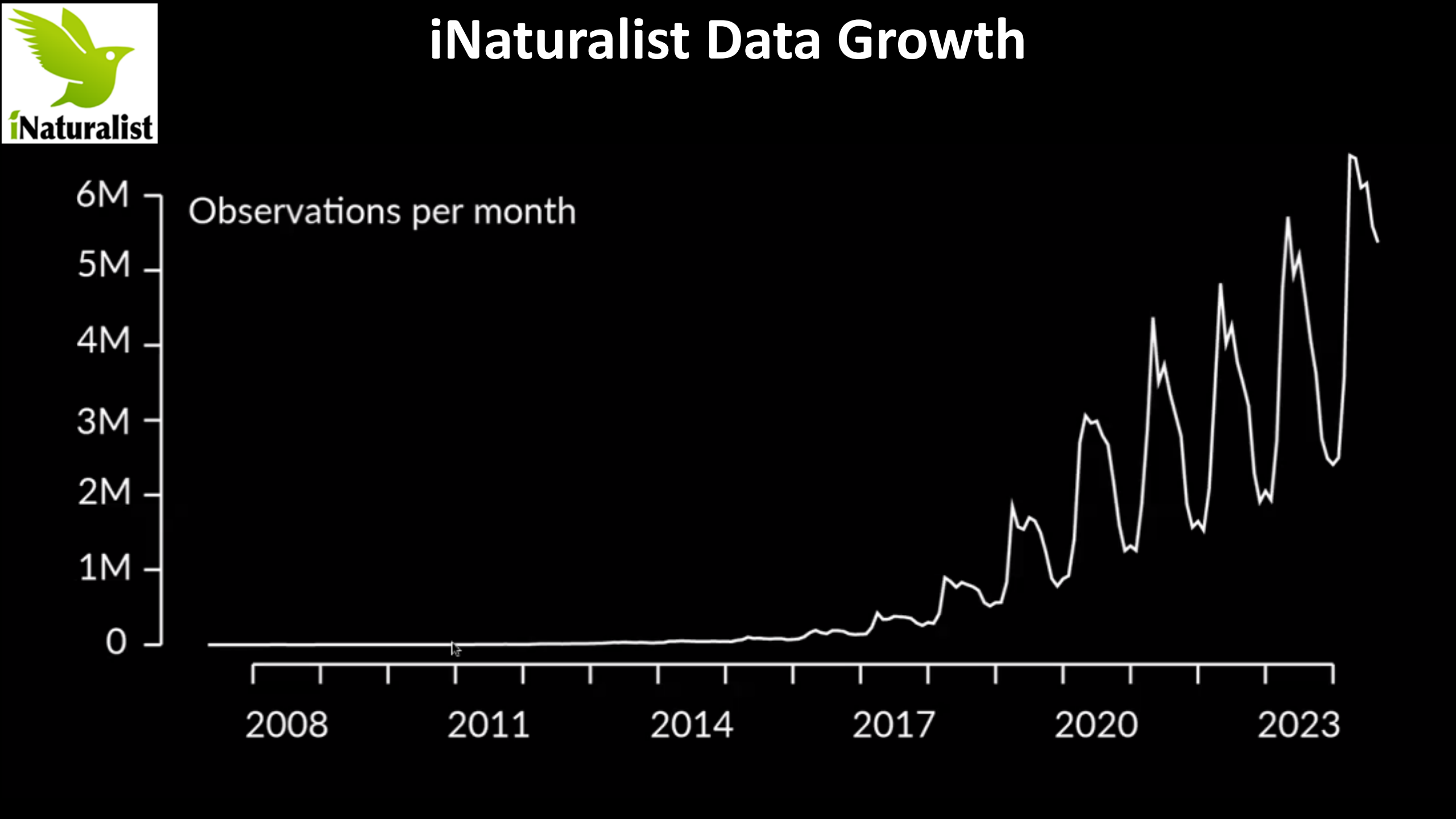
= 391,275 (9,422 non-native plants & 3,593 non-native animals)

- Addictive and fosters user appreciation of all species
- iNaturalist community assists with record curation
- We have automated appends of “expert” identified records
- Photo & sound file documentation is fully linked to tabular records
- Records are very easier to review in iNaturalist

Observation.org = 411…mostly common natives reported by Dutch tourists

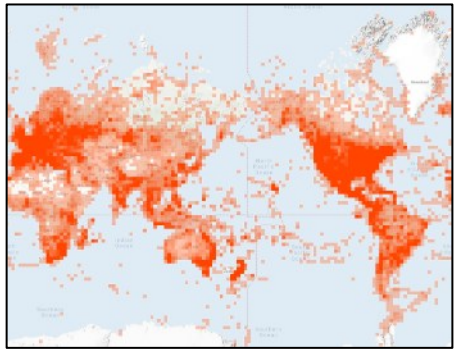
= 153…mostly common natives reported by European tourists

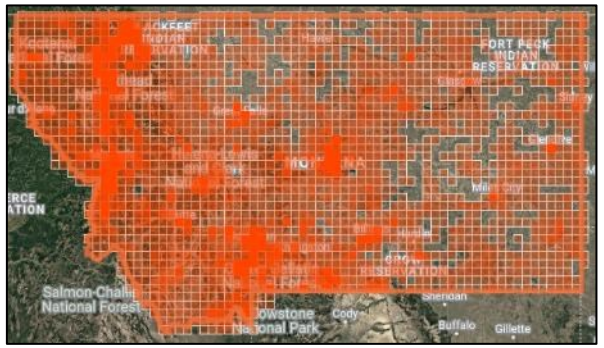
iNaturalist Data Growth



iNaturalist

https://www.inaturalist.org/





Global	218,558,230 OBSERVATIONS	496,136 SPECIES	396,744 IDENTIFIERS	3,433,422 OBSERVERS
Montana	391,275 OBSERVATIONS	8,845 SPECIES	10,138 IDENTIFIERS	19,220 OBSERVERS

- Monthly download of records with “expert ID”
- 728 “expert identifiers” across North America
- 25% of MT records with expert ID added to MTNHP

Taxa	No. of Orders	Total No. of Obs	No. Obs for SOC	No. Obs for Non-natives
Vertebrates	40	31,301	5,649	944
Invertebrates	28	14,209	96	1,504
Fungi	22	535	?	39
Lichens	12	146	5	3
Mosses	7	13	1	0
Vascular Plants	58	47,959	291	9,111

iNaturalist Non-native Species Watchlist

https://tinyurl.com/sf6v5tb8

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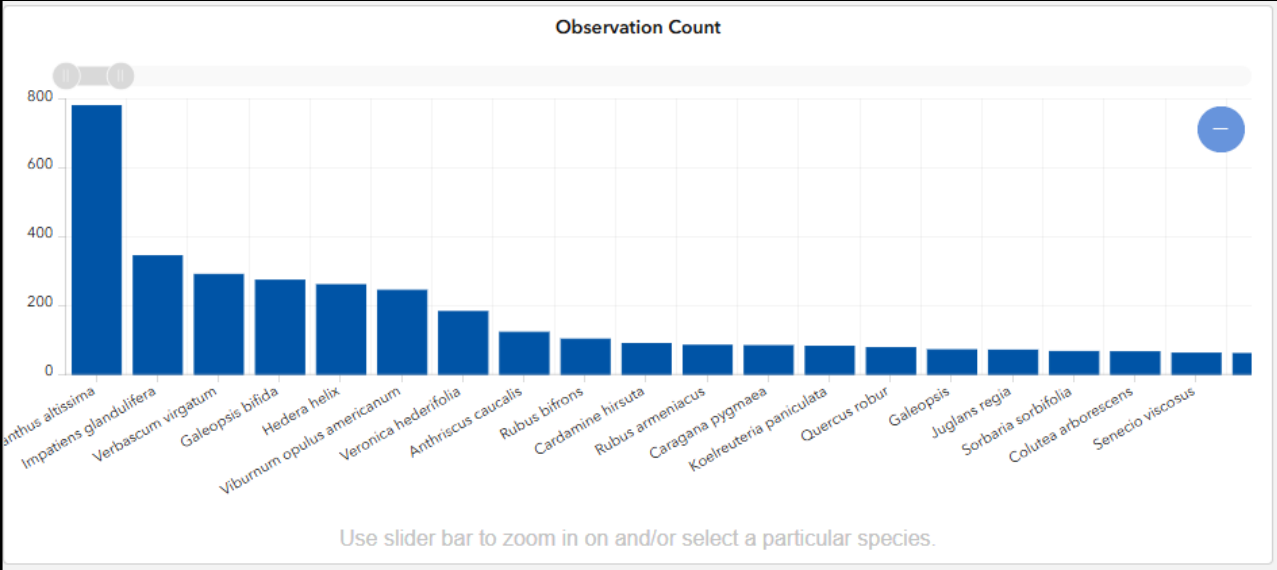
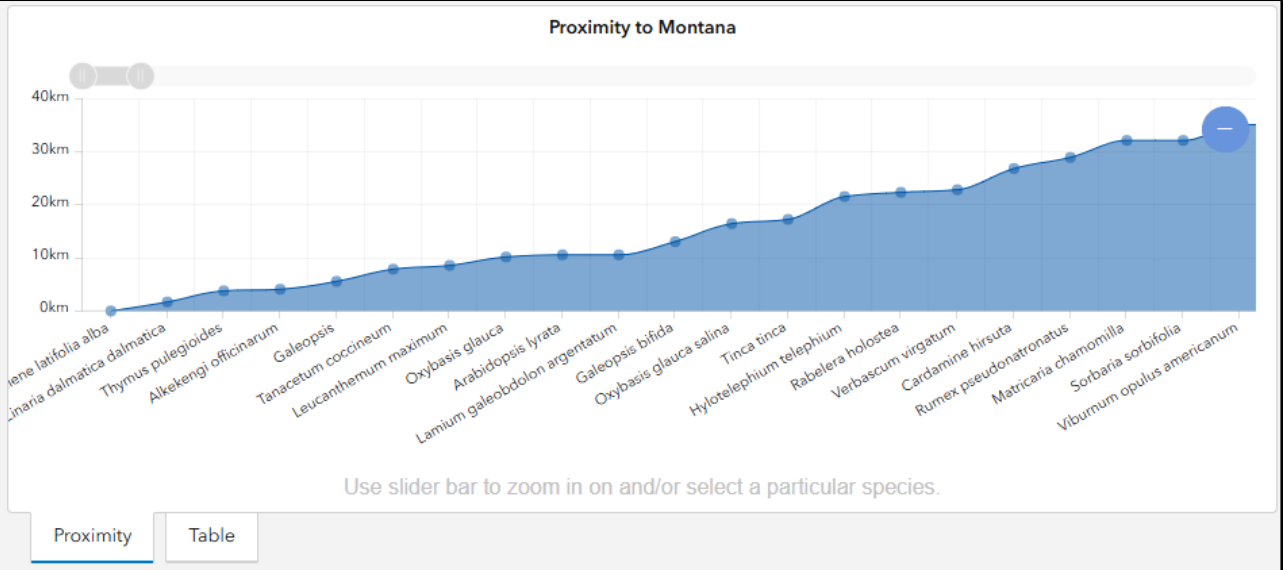
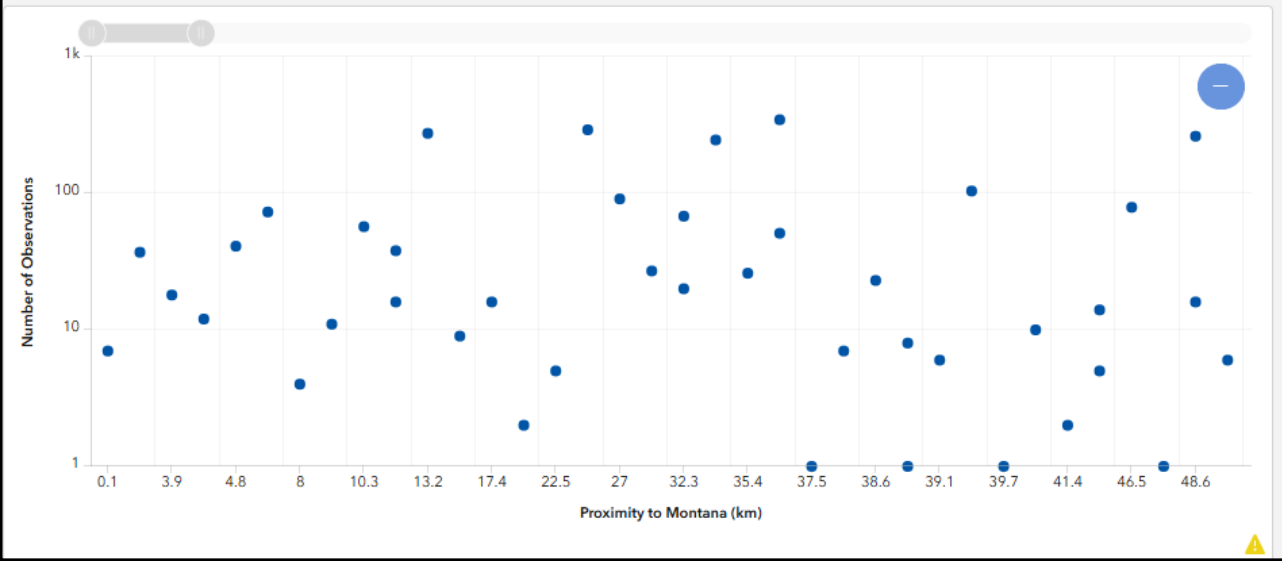
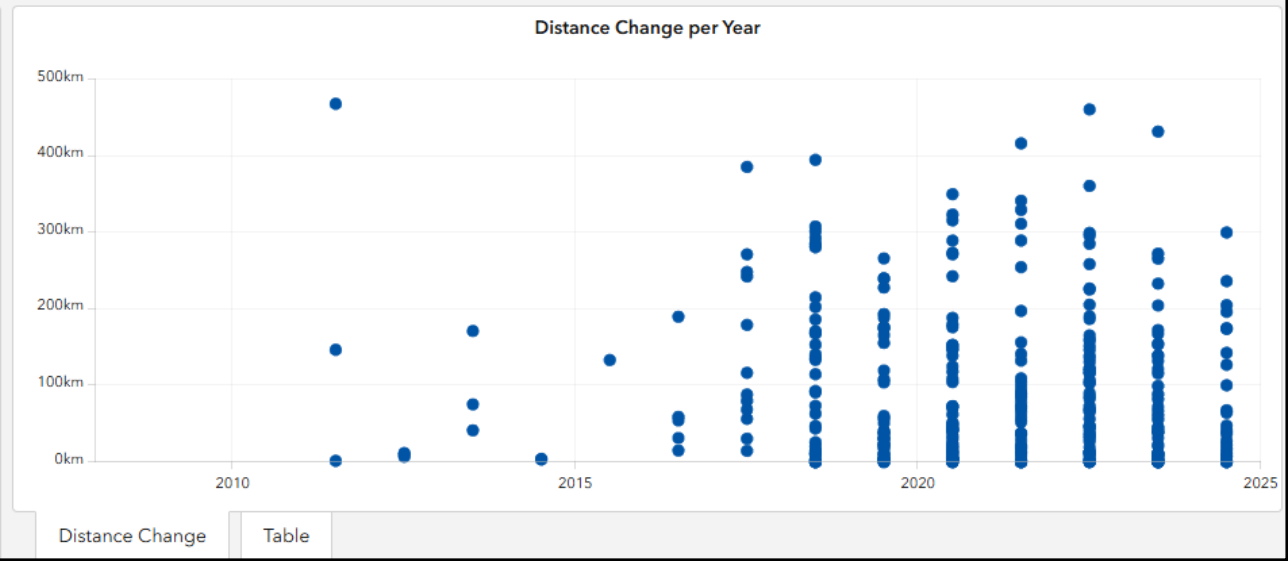
Chart View









iNaturalist Non-native Species Watchlist

https://tinyurl.com/sf6v5tb8

Map View with Playable Time Series

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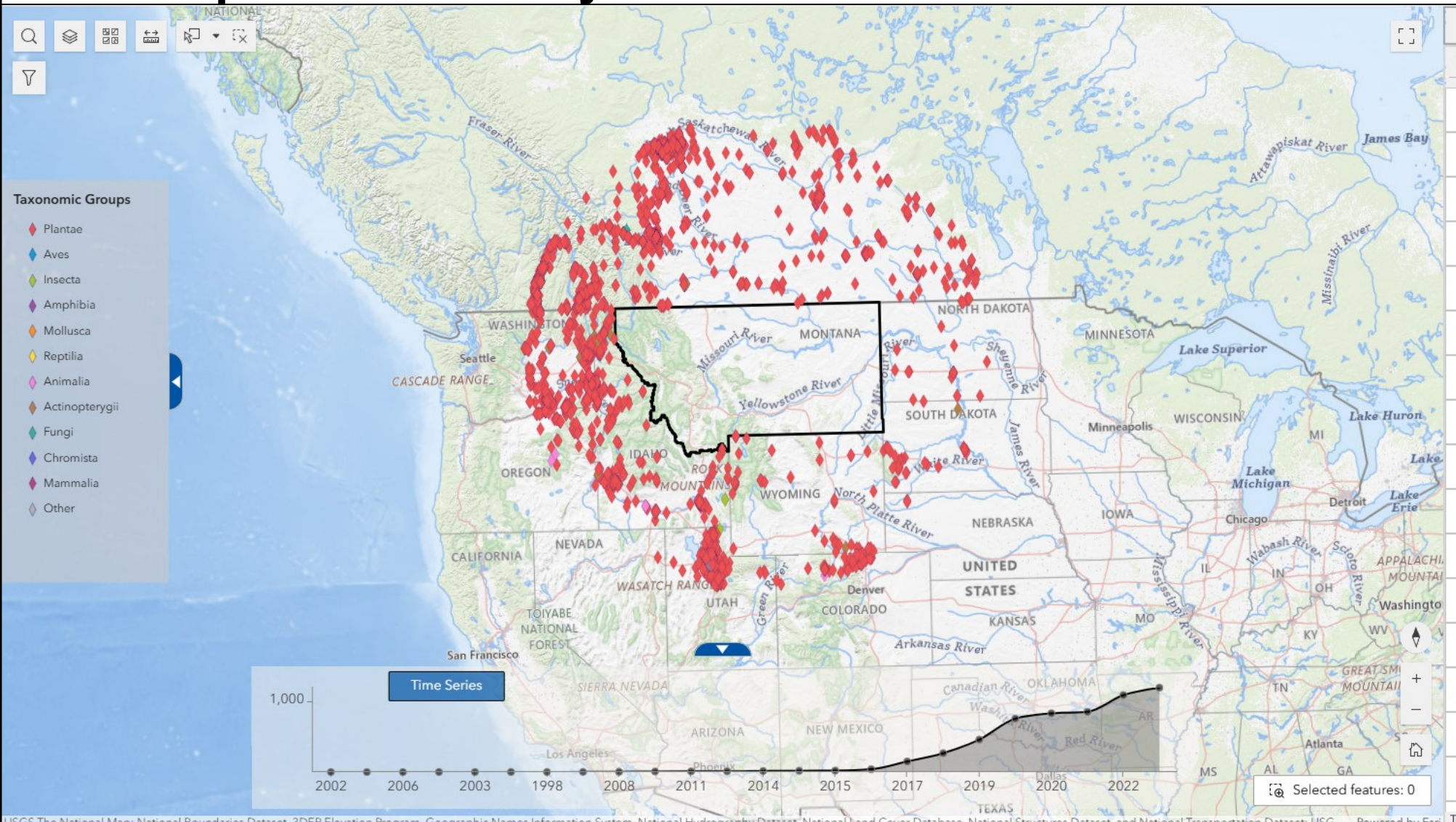

Species Filter

Search | A-Z

L48(I)CAN(I)	Acer campestre | field maple
	Acer circinatum | Vine Maple
	Acer palmatum | Japanese maple
	Acer pseudoplatanus | sycamore maple
	Achillea asiatica | Asian Yarrow
L48(I)CAN(I)	Aconitum napellus | Monk's-hood
L48(I)	Actinidia arguta | Hardy kiwifruit
PestF	Adelges piceae | Balsam Woolly Adelgid
PestA	Agriotes lineatus | Lined Click Beetle
L48(I)	Agropyron fragile | Siberian Wheatgrass
	Agrostis stolonifera pseudopungens |
L48(I)	Ailanthus altissima | tree-of-heaven
	Ailanthus altissima altissima |
L48(I)AK(I)HI(I)CA	Aira caryophyllea | Silver Hairgrass
L48(I)	Akebia quinata | Five-leaf akebia
L48(I)	Albizia julibrissin | Persian silk tree
	Albizia julibrissin julibrissin | Mimosa

Total: 421 | Selection: 0

USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program, Geographic Names Information System, National Hydrography Dataset, National Land Cover Database, National Structures Dataset, and National Transportation Dataset; USG... Powered by Esri

iNaturalist Non-native Species Watchlist

https://tinyurl.com/sf6v5tb8

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Data View

Change in Observation Counts

- ✓ Change in Observation Counts
- Record Distance to Montana
- Change in Distance to Montana

		on Name	Year	Obs Count	Previous Obs Count	% Change	Wiki URL
Plantae	Albizia julibrissin	Persian silk tree	2020	2			View
Plantae	Albizia julibrissin	Persian silk tree	2021	3	2	50.0	View
Plantae	Albizia julibrissin	Persian silk tree	2022	1	3	-66.7	View
Plantae	Albizia julibrissin	Persian silk tree	2023	1	1	0.0	View
Plantae	Albizia julibrissin	Persian silk tree	2024	1	1	0.0	View
Plantae	Taxus baccata	common yew	2021	1			View
Plantae	Taxus baccata	common yew	2024	1	1	0.0	View
Plantae	Nerium oleander	oleander	2024	2			View
Plantae	Populus tremula	European aspen	2021	1			View
Plantae	Populus tremula	European aspen	2022	1	1	0.0	View
Plantae	Populus tremula	European aspen	2023	2	1	100.0	View
Plantae	Populus tremula	European aspen	2024	2	2	0.0	View
Plantae	Juniperus sabina	savin juniper	2023	1			View
Plantae	Sherardia arvensis	Field madder	2022	1			View
Plantae	Sherardia arvensis	Field madder	2024	1	1	0.0	View
Plantae	Impatiens glandulifera	Himalayan balsam	2013	1			View
Plantae	Impatiens glandulifera	Himalayan balsam	2017	6	1	500.0	View

otal: 1,218 | Selection: 0

Audit Reports Identifying iNaturalist Records of Particular Interest

Edit Run

iNaturalist - Animal Observations with no Model Support
These are observations from iNaturalist that don't intersect an area predicted to suitable by our models. These observations should be given extra scrutiny. If an observation is acceptable and you wish to remove it from this audit, use Model_Flag = 8. Also see Model_Flags 10, 13, 14, 16, & 19 as needed.

Edit Run

iNaturalist - Introduced Species Monthly Report
These introduced species **(defined introduced by iNaturalist as "Introduced in Montana, US: arrived in the region via anthropogenic means")** were reported as observed in Montana and currently **are not being tracked** by the Montana Natural Heritage Program (MTNHP). Species are organized by Iconic Taxon and Name. **Actual observations and dates reported are found at the individual observation (record) level.** See specific species observation overview at the links below

Edit Run

iNaturalist - Isolated Animal Record Check
These observations are flagged as being secluded as they have a distance > 10 km from existing In Production records. Uncertainty must be < 10 km. Updated Production records are denoted by an Obs_ID and database assignment. *This review is only assessing Working Project records.

Edit Run

iNaturalist - Isolated Plant Record Check
These observations are flagged as being secluded as they have a distance > 10 km from existing In Production records. Uncertainty must be < 10 km. Updated Production records are denoted by an Obs_ID and database assignment. *This review is only assessing Working Project records.

Edit Run

iNaturalist - New Species
Recent iNaturalist observation exports are cross-referenced with inat_LUT_Taxa for any new Taxa additions. Taxa not previously found in the look-up-table are cross-walked with [dbo].[Species] and [dbo].[Species_Alt_Sci_Name]. Elcodes are assigned where a match is found and is left unassigned where no match was initially determined. Returned records are organized by Elcode, taxon group, and scientific name. Actions needed: - A review of taxa with an unassigned ELCODE; establish

Edit Run

iNaturalist - New Species Records
Recent iNaturalist observation exports are cross-referenced with inat_LUT_Taxa for any new Taxa additions. Taxa not previously found in the look-up-table are cross-walked with [dbo].[Species] and [dbo].[Species_Alt_Sci_Name]. Elcodes are assigned where a match is found and are left unassigned where no match was initially determined. Returned records are organized by taxon group and scientific name. Actions needed: - A review of taxa with an unassigned ELCODE; establish if a

iNaturalist - Obscuring Changes
Recent iNaturalist observation exports are compared to the prior export for a change in the obscuring status. Records include both in Production and In Need of Review records. In Production records are denoted by an Obs_ID and database assignment. Actions needed: - A review of unobscured records currently in Production; establish if any further action is required. - An assessment of any new species obscuring of which may require iNaturalist involvement. Actions taken: - In Production records of

iNaturalist - PRD Observation Updates
iNaturalist in Production (PRD) observation are cross-referenced to recent iNaturalist exports for any recent updates. Updates are referenced in the Update Note column. Records are reported as the recent iNaturalist export in the Working Project adjoined by the corresponding in Production record denoted by a database assignment and Obs_ID. Actions needed: - A review of record locality changes; establish if updates should be applied to PRD records. - A review of record taxon changes; establish if updates

iNaturalist - Range: Intersection check for Animals
These observations are outside of the range as currently delineated for the assigned species. Uncertainty must be < 10 km. Distance separating the point observation and the range is provided for reference. Possible resolutions: - remap observation - remap range - label observation as aberrant, but valid out of range record (Model_Flag = 16 or 19) - reclassify observation (different species, increase locational uncertainty, etc.) - delete observation

iNaturalist - Range: Intersection check for Plants
These observations are outside of the range as currently delineated for the assigned species. Uncertainty must be < 10 km. Distance separating the point observation and the range is provided for reference. Possible resolutions: - remap observation - remap range - reclassify observation (different species, increase locational uncertainty, etc.) - delete observation

iNaturalist - Species of Concern for Animals
iNaturalist observation currently staged in the iNaturalist Working Project are assessed for Species of Concern. Records that have been updated and are in current Production are denoted by an Obs_ID and database assignment. Additional remarks can be found in the mtnhp_ReviewNote column. Actions needed: - A review of updated records currently in Production; establish if any further action is required. - A full record review is needed in order validate of the observations as well as establish

iNaturalist - Species of Concern for Plants
iNaturalist observation currently staged in the iNaturalist Working Project are assessed for Species of Concern. Records that have been updated and are in current Production are denoted by an Obs_ID and database assignment. Additional remarks can be found in the mtnhp_ReviewNote column. Actions needed: - A review of updated records currently in Production; establish if any further action is required. - A full record review is needed in order validate of the observations as well as establish

***We then review records within iNaturalist as needed.**

Once they have "expert identifications", they are incorporated into the MTNHP data system.

Audit Reports eMailed to Invasive Species Managers

New Weed Observations - by USFS Ranger District

These noxious weed observations were added to the MTNHP database in the last quarter. Observations are organized by USFS Ranger District. **Actual observation dates may be before this period.** See these and other records in https://mtnhp.org/mapviewer/

Rerun this report: http://intranet.nhp.mt.gov/SQLPRDNightlyAuditRunOne.asp?i=178

250 records in this report This report runs every First of Quarter morning

RANGER_DISTRICT	MT_Weed_Status	Field_Guide_Link	MapViewer_Link	S_Com_Name	Num_Obs_Last_Quarter_in_USFS_RD	Tot_Obs_For_USFS_RD	Tot_Obs_For_State
Beaverhead-Deerlodge National Forest, Butte Ranger District	State Listed Weed: N2B	PDAST2E090	Cirsium arvense	Canada Thistle	4	229	54018
Beaverhead-Deerlodge National Forest, Butte Ranger District	County Listed Only	PDAST1S040	Carduus nutans	Musk Thistle	3	73	10738
Beaverhead-Deerlodge National Forest, Butte Ranger District	State Listed Weed: N2B	PDAST1Y140	Centaurea stoebe	Spotted Knapweed	1	1282	144060

New Weeds Observations >2km from Existing Obs

These noxious weed observations were added to the MTNHP database in the last week and are >2km from all previous observations (if mapped precise
before this period. See these and other records in https://mtnhp.org/mapviewer/

5 records in this report This report runs every Sun morning

Field_Guide_Link	S_Com_Name	MT_Status	Obs_ID	Location	Latitude	Longitude	Distance_fromOldObs_km	Date_Added	Date_Observed
PDELG01010	Russian Olive	R3	2374150	Somers	48.09279	-114.23490	9.24	2024-11-01	2024-10-25
PDELG01010	Russian Olive	R3	2373791	Broadwater County	46.38551	-111.48945	3.9	2024-11-01	2024-08-17
PDRHA0C050	Common Buckthorn	N2A	2374137	Bozeman	45.66409	-111.07144	2.69	2024-11-01	2024-10-03
PDRHA0C050	Common Buckthorn	N2A	2373921	Nature Park, Helena	46.60909	-112.03140	2.65	2024-11-01	2024-10-08

New AIS Observations - >2km from Existing Obs

These AIS observations were added to the MTNHP database in the last week and are >2km from all previous observations (if mapped p
period. NOTE: FWP-sourced AIS observations are excluded. See these and other records in https://mtnhp.org/mapviewer/

1 records in this report This report runs every Sun morning

Field_Guide_Link	S_Com_Name	MT_Status	Obs_ID	Location	Latitude	Longitude	Distance_fromOldObs_km	Date_Added	Date_Observed
ICMAL11670	Virile Crayfish	AIS	56900320	Lake County	47.43225	-114.10554	3.21	2024-11-01	2024-09-09

***Managers can then look at records in the Map Viewer web application.**

Montana Weed Dashboard http://tinyurl.com/2krv3w9r

Montana Invasive Weed Dashboard

Montana Natural Heritage Program

County	USFS Boundary	USFS Ranger District	BLM Office	Tribal Boundary	Scientific Name	Common Name	State-listed Nox Weeds	County-listed Nox Weeds
None	None	None	None	None	None	None	None	None

County

Montana Invasive Weed Observations

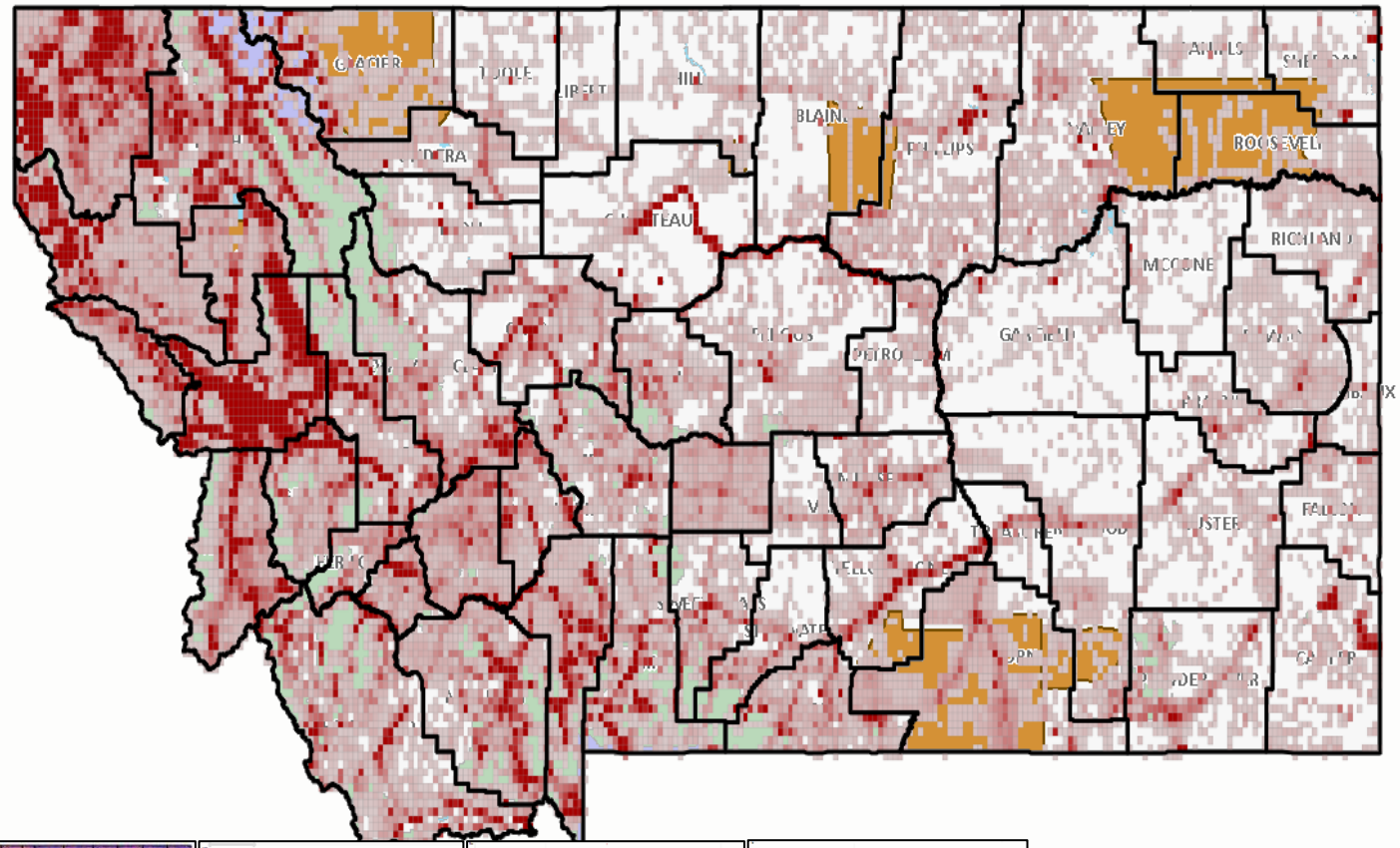
aggregateCount

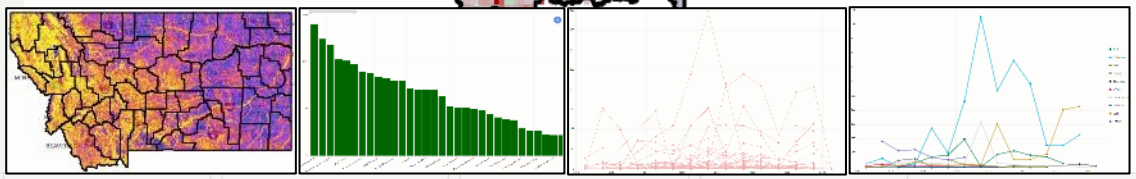
> 100

50

< 0

Obs Density Map: displays the relative density of observations as recorded in MTNHP databases. At the upper right of the map screen you can turn on a legend, turn on and off overlaying map layers, and select from a variety of base maps. The home button will zoom the map to the statewide view. To see details associated with observations use the MTNHP's Map Viewer web application.





Obs Density Map | Nox Weed Risk Map | Species Obs Summary | Reported Obs by Year: | Data Source by Year

Total Observations

608,820

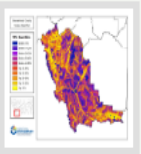
Last update: 2 minutes ago

Total Species

491

Last update: 2 minutes ago

- Field Guide
- Map Viewer
- Species Snapshot
- Predicted Habitat Suitability Models
- County Dashboard
- Statewide Cumulative Noxious Weed Risk
- County-scaled Cumulative Noxious Weed Risk Image



About

Getting Set Up with MTNHP Survey123 Forms

Step 1 → Download Survey123 from your App Store

Available on the App Store

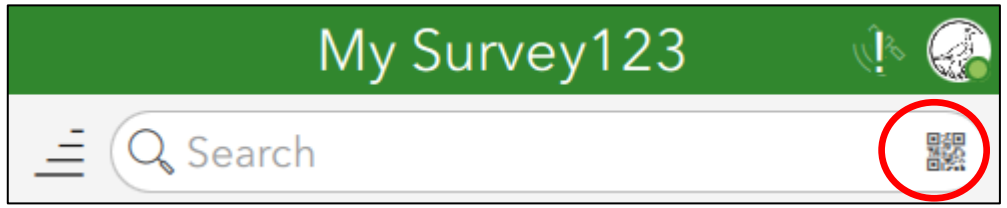
GET IT ON Google Play

Get it from Microsoft

Step 2 → If you have organizational access to ArcGIS Online, Login to Survey123 App using your agency credentials…otherwise go to Step 3.

Step 3 → Download an MTNHP survey form

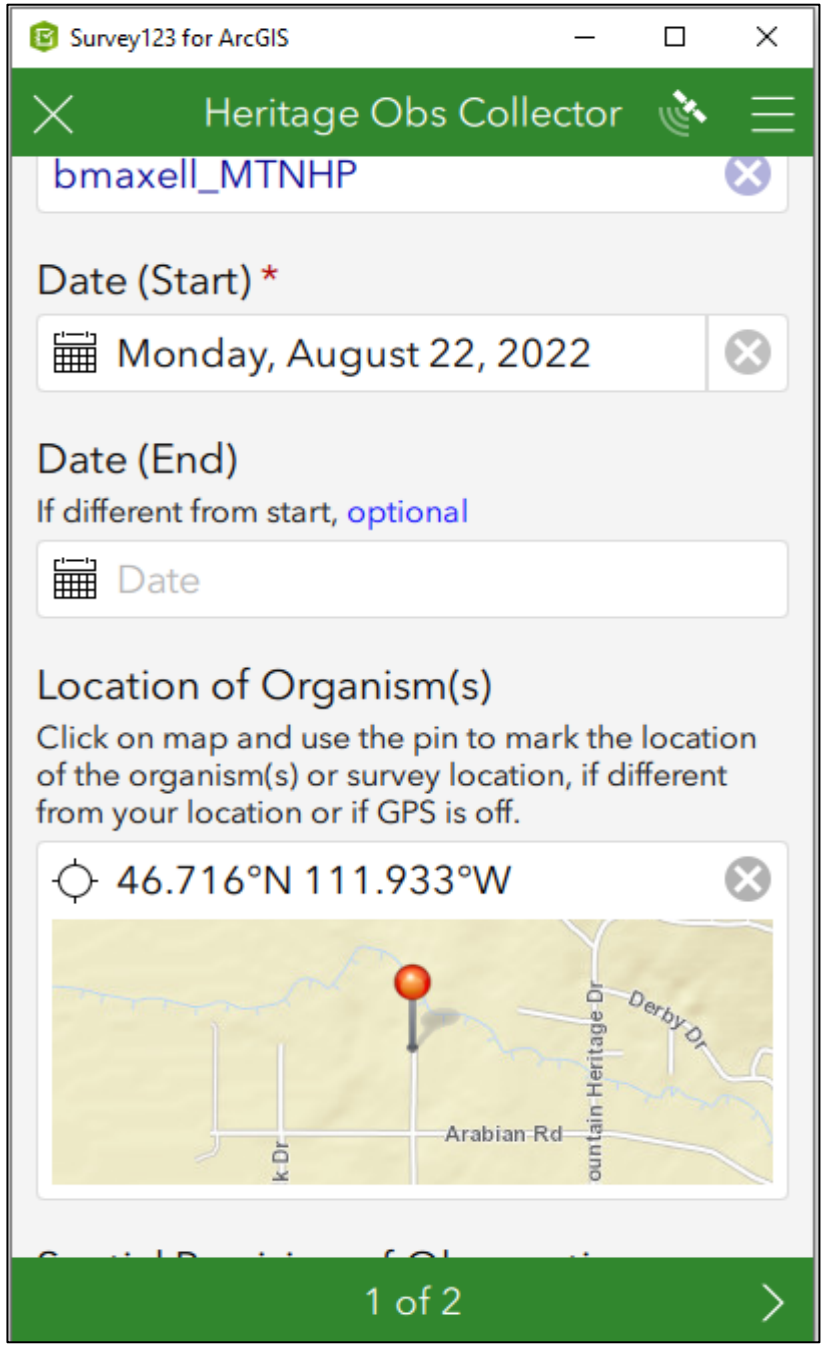
Open Survey123 app and use the QR scanner button to scan a code below

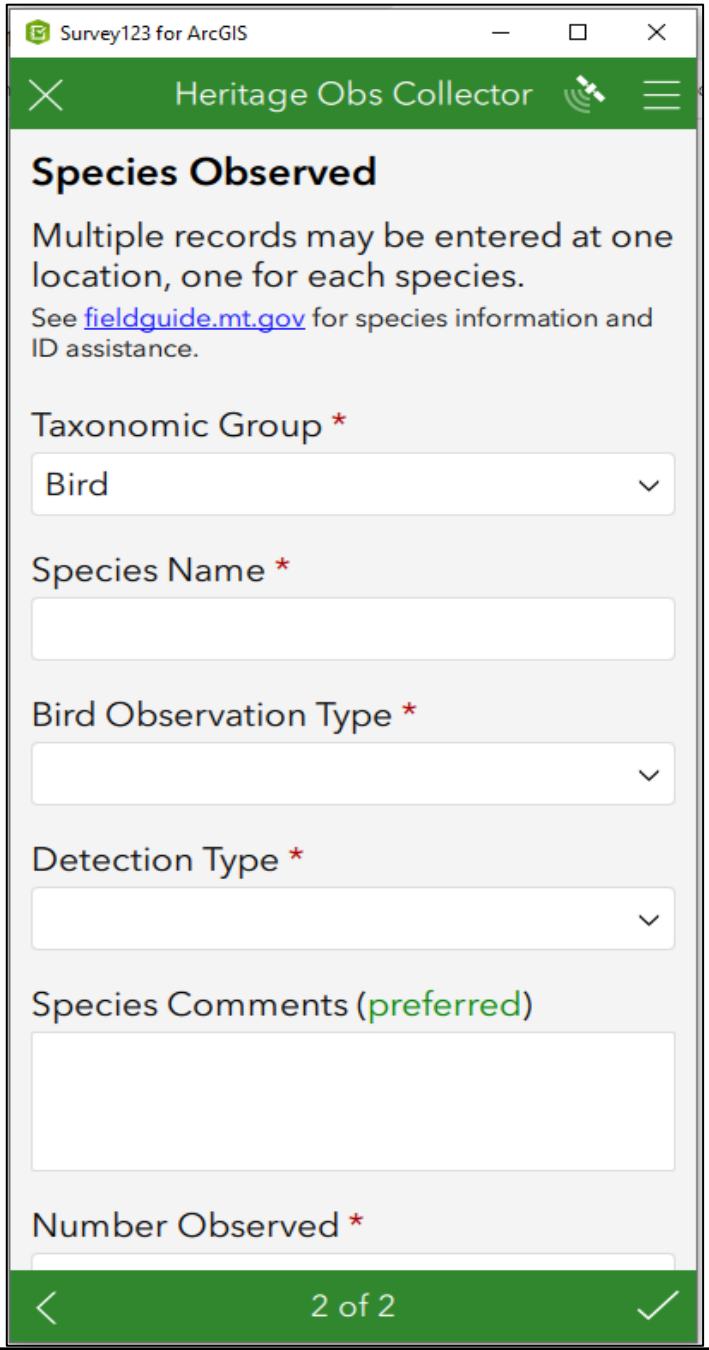


Heritage Observation Collector https://arcg.is/1zPPnO0

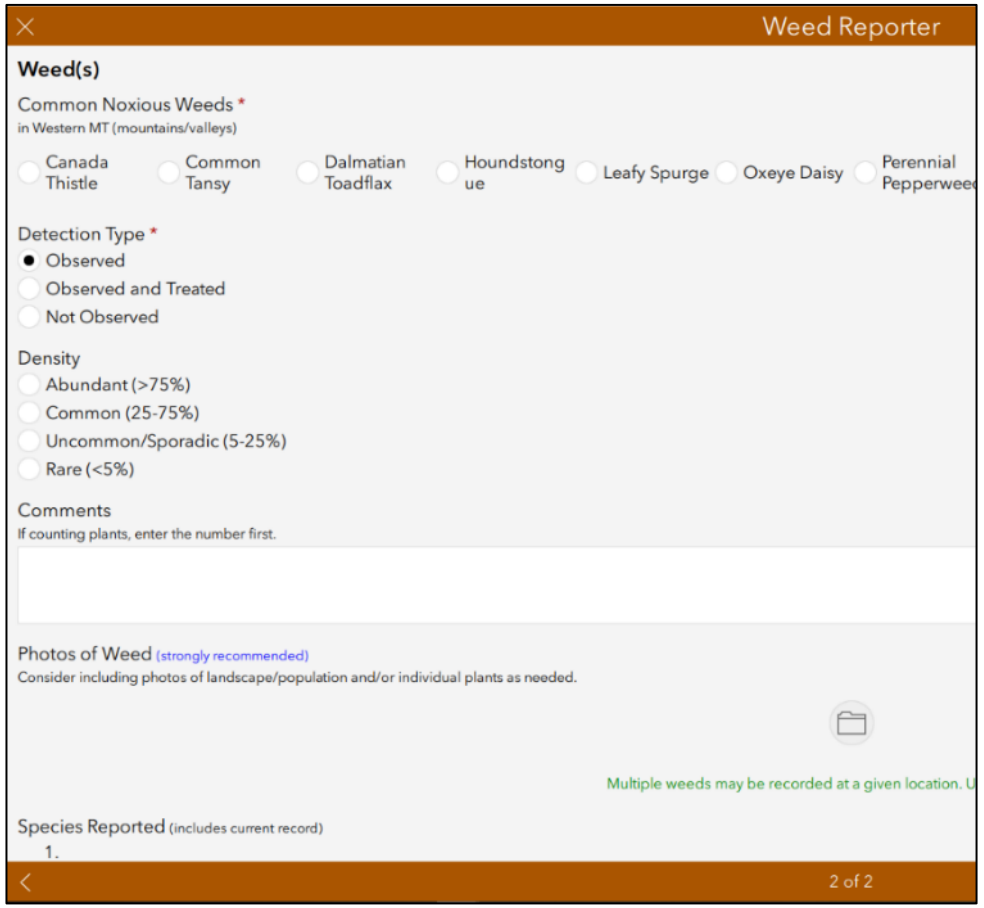
Rapid Weed Reporter https://arcg.is/14fv4n0

Heritage Observation Collector





Rapid Weed Reporter



Setting up an iNaturalist Account

1. Create an account at https://www.inaturalist.org/
2. Download iNaturalist or **iNaturalist Next** app on your cell phone from your favorite app store

Available on the App Store

GET IT ON Google Play

3. LogIn to your recently created account

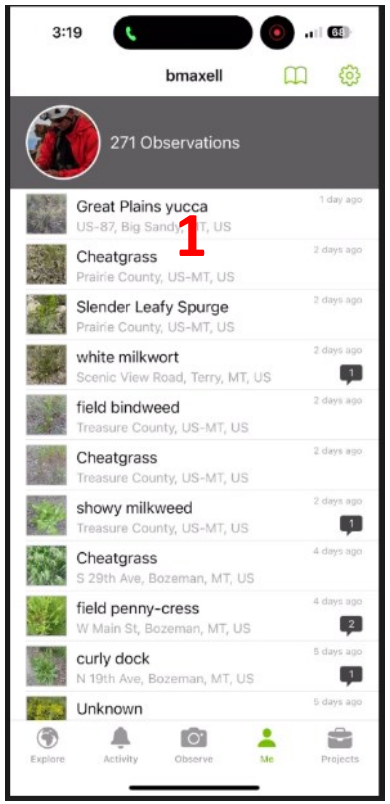
Phone

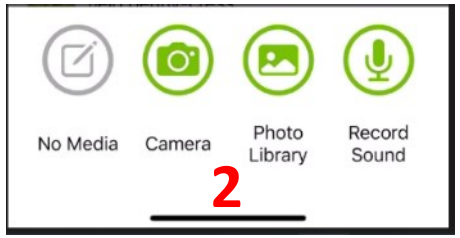
1. **Click Observe**
2. **Select photo or sound source**
3. **Identify what you saw as best you can. Use suggestions by iNaturalist for assistance.**

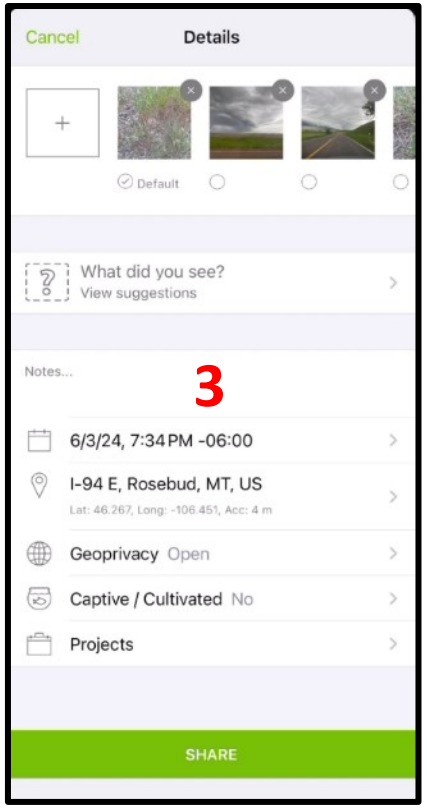
Desktop (see following slides)

1. **Subscribe to species of interest to get reports of observations for species & areas of interest**
2. **Identify observations of others**

Training Video
https://youtu.be/mKOeG_M5DnI





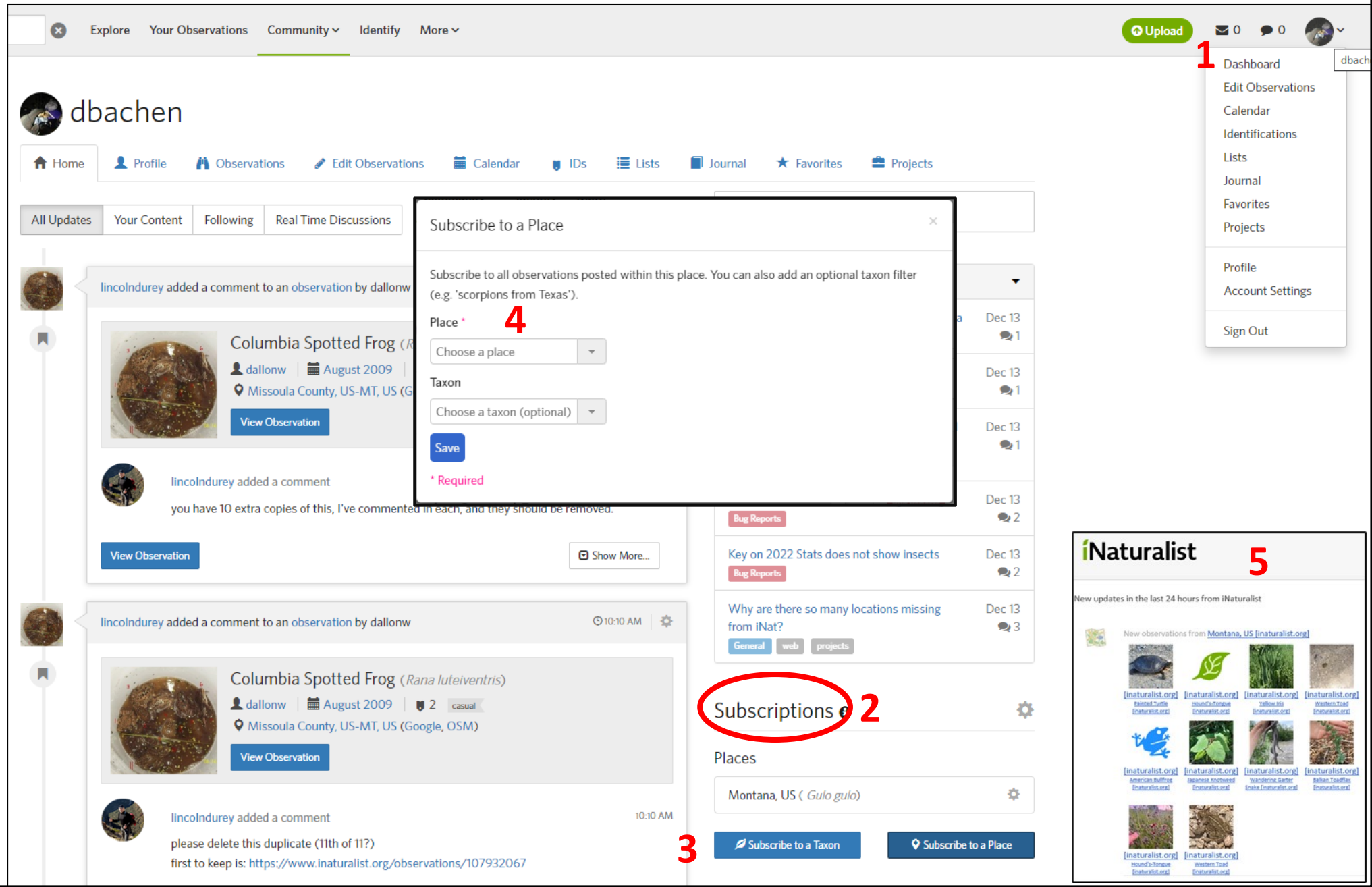


iNaturalist Resources

- Seek by iNaturalist for assistance with identification
  - https://www.inaturalist.org/pages/seek_app
- iNaturalist Resources for observers
  - https://www.inaturalist.org/pages/video+tutorials
- Guide for taking iNaturalist photos
  - https://bcparksfoundation.ca/site/assets/files/1697/inaturalist_photo_guide_-_final.pdf
- Montana Natural Heritage Observations Project
  - https://www.inaturalist.org/projects/montana-natural-heritage-observations
- How to submit data to the Montana Natural Heritage Observations Project
  - https://www.youtube.com/watch?v=uiXwDiAuXxw
- Individuals with expertise willing to be tagged to assist with ID in Montana
  - Scott Mincemoyer (vascular plants): @scott_mt
  - Peter Achuff (vascular plants): @plachuff
  - Kenda Herman (vascular plants): @kendarae
  - Dan Bachen (general resource, vertebrates): @dbachen
  - Bryce Maxell (general resource, vertebrates): @bmaxell
  - Zach Shattuck (fish): @pantosteus
  - Alexis McEwan (amphibians, reptiles): @lex_13
  - Bo Crees (birds): @bocrees
  - Ian Foley (invertebrates): @ian26
  - Noah Siegel (fungi): @noah_siegel
  - Ryan Patrick (fungi): @biglaughinggym
  - Craig McLane (aquatic invasive species): @cmclane

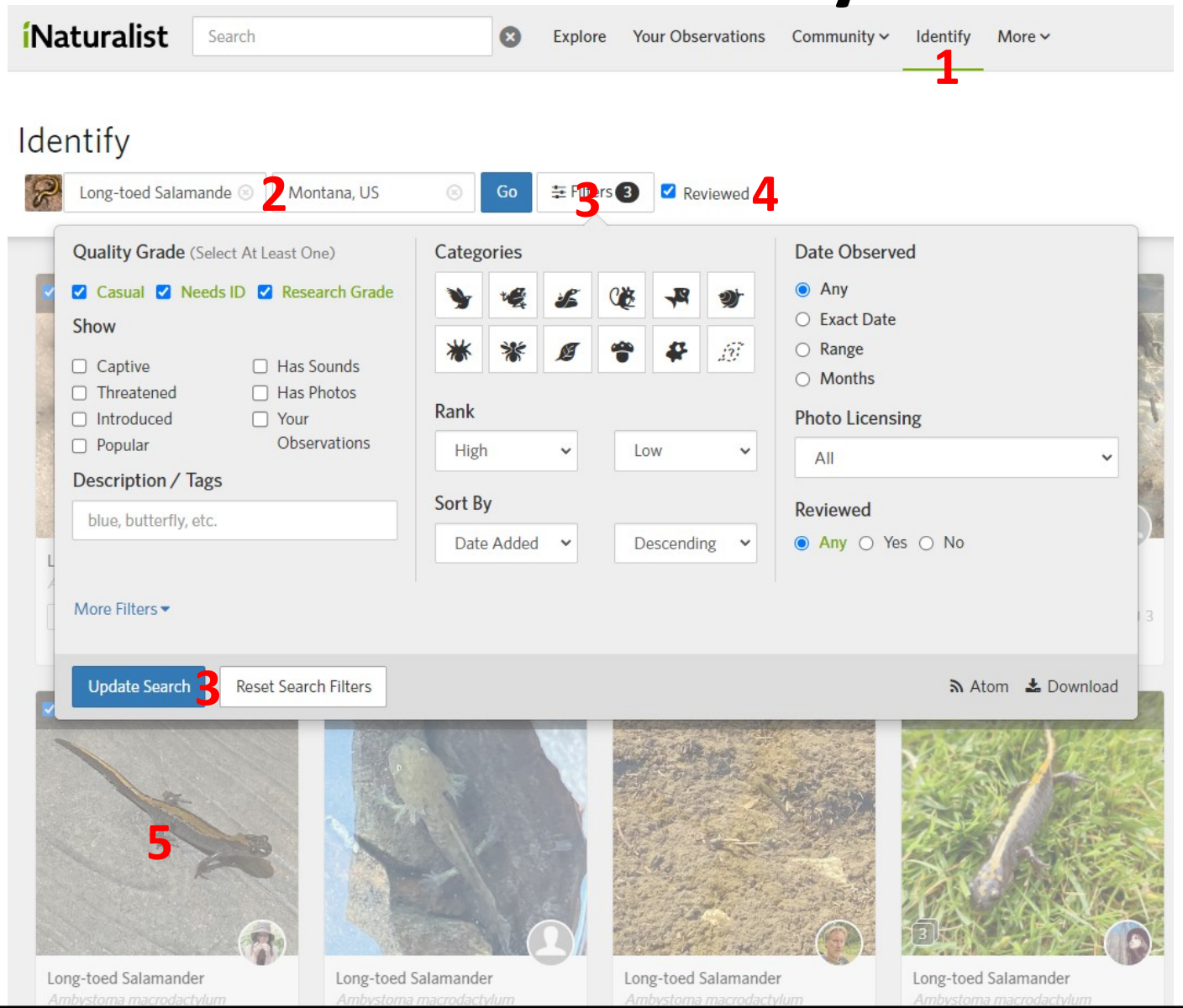
Setting Alerts for Species Observations

1. Navigate to Account Dashboard
2. Look for the “Subscriptions” box. Note that you may need to scroll down. Its dynamic and can usually be found on the right or bottom
3. To subscribe to updates from anywhere across the species range select “Subscribe to a Taxon” to limit your subscription to Montana or a discrete geographic area select “Subscribe to a place”
4. In the popup window choose the appropriate place and taxon. Note that if Taxon is left blank all observations from that place will be included.
5. You will receive a daily email of records submitted for taxa you have subscribed to.



Identifying Records to Become a Better Naturalist & Assist iNaturalist Community

1. Click on the Identify tab.
2. Select the species and place of interest
3. Open the Filters menu and select the review criteria you want…selections shown will show all records…then click Update Search at lower left
4. If you only want to see records you have not already reviewed, turn off the Reviewed checkbox
5. Click on individual records and review details of location, date, accuracy and click Agree with previous identification or enter your identification.

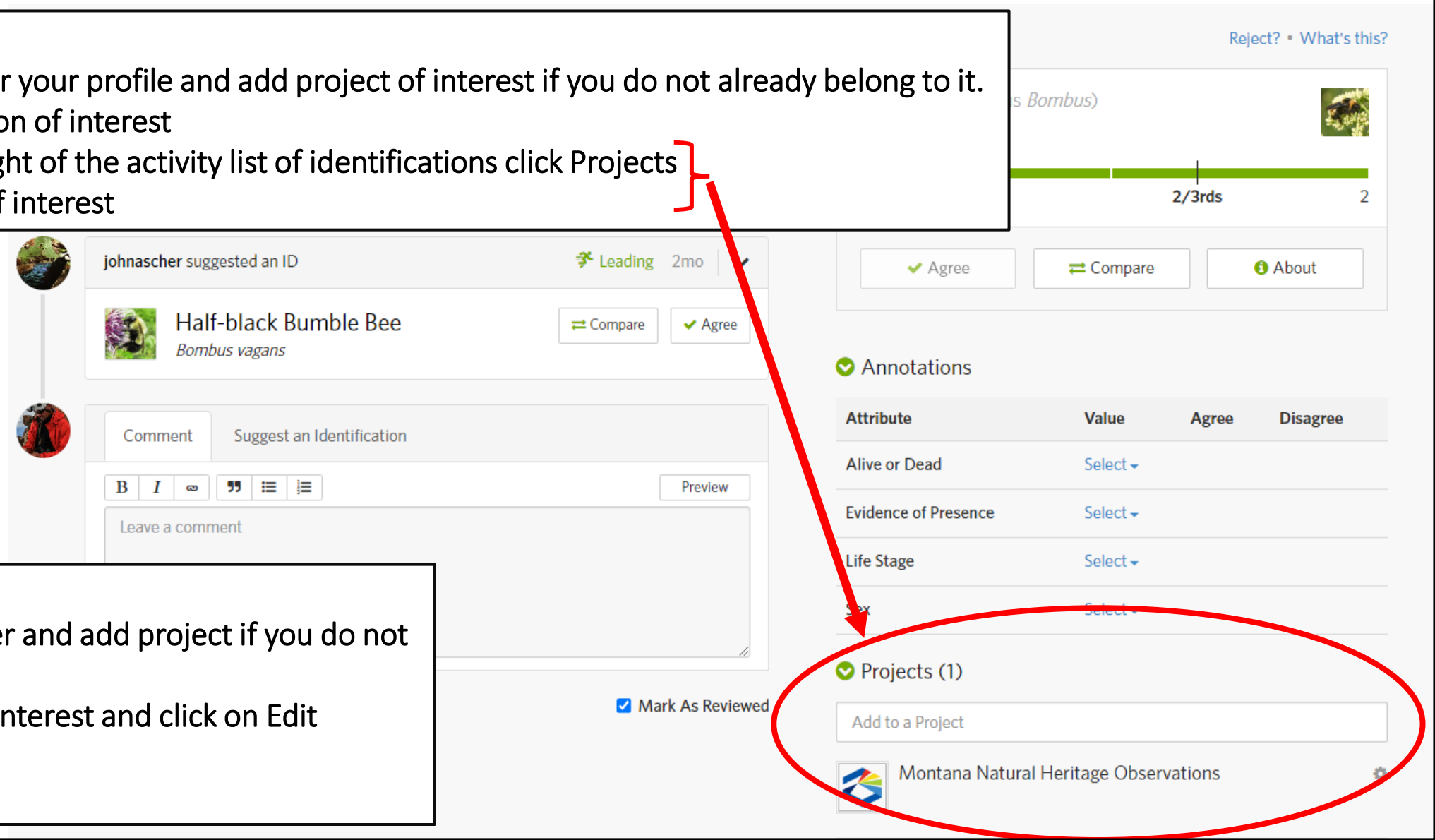


Adding Entered Observations to MTNHP Project

***This is only necessary for "obscured" observations so that MTNHP and resource managers can see the precise location of the observation.**

On Desktop Computer

1. Go to Projects under your profile and add project of interest if you do not already belong to it.
2. Go to the observation of interest
3. Below and to the right of the activity list of identifications click Projects
4. Select the project of interest



On phone app:

1. Click on Projects folder and add project if you do not already belong to it.
2. Go to observation of interest and click on Edit
3. Open Projects folder
4. Select project

Questions?

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(406) 444-3989

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