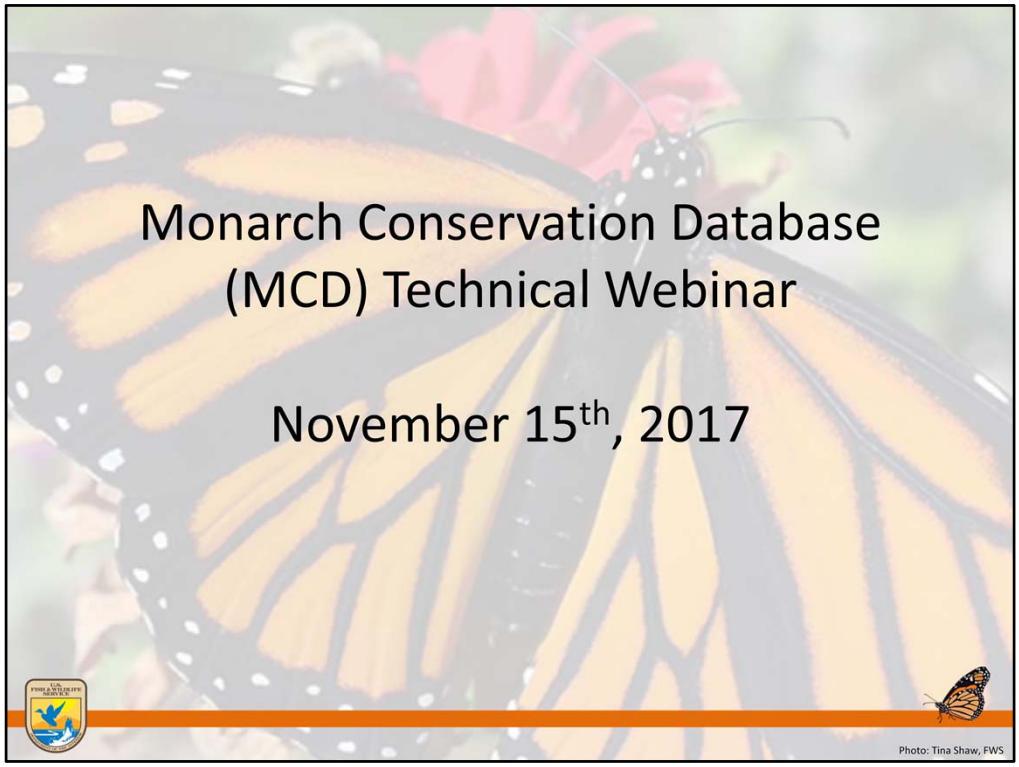
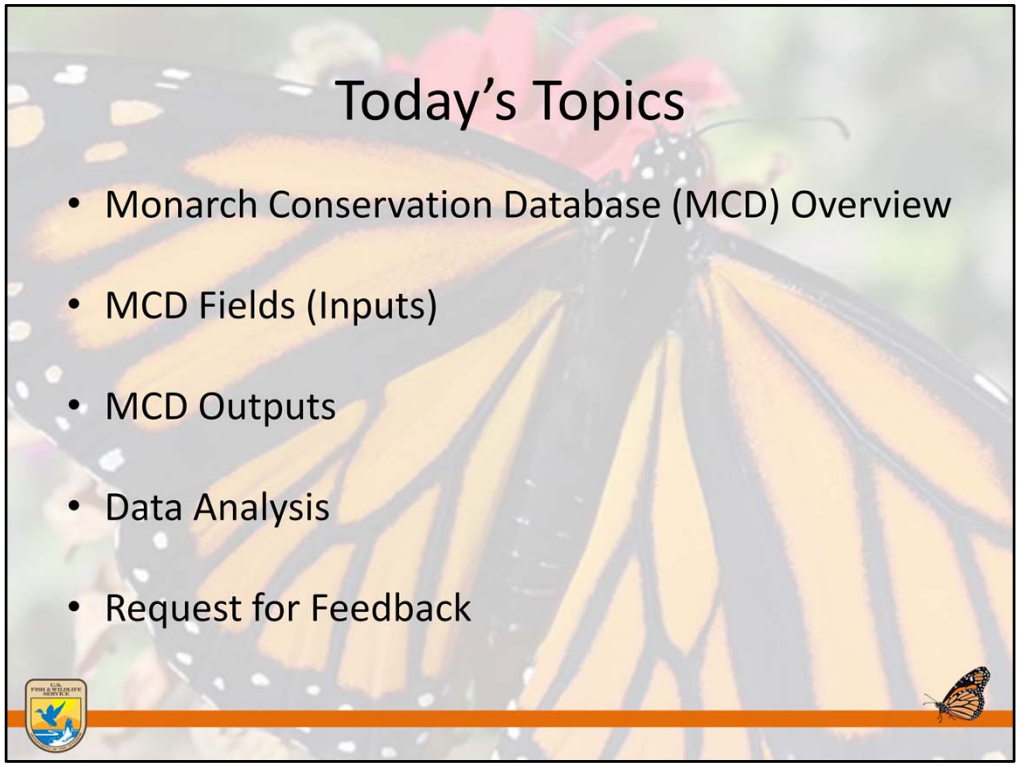
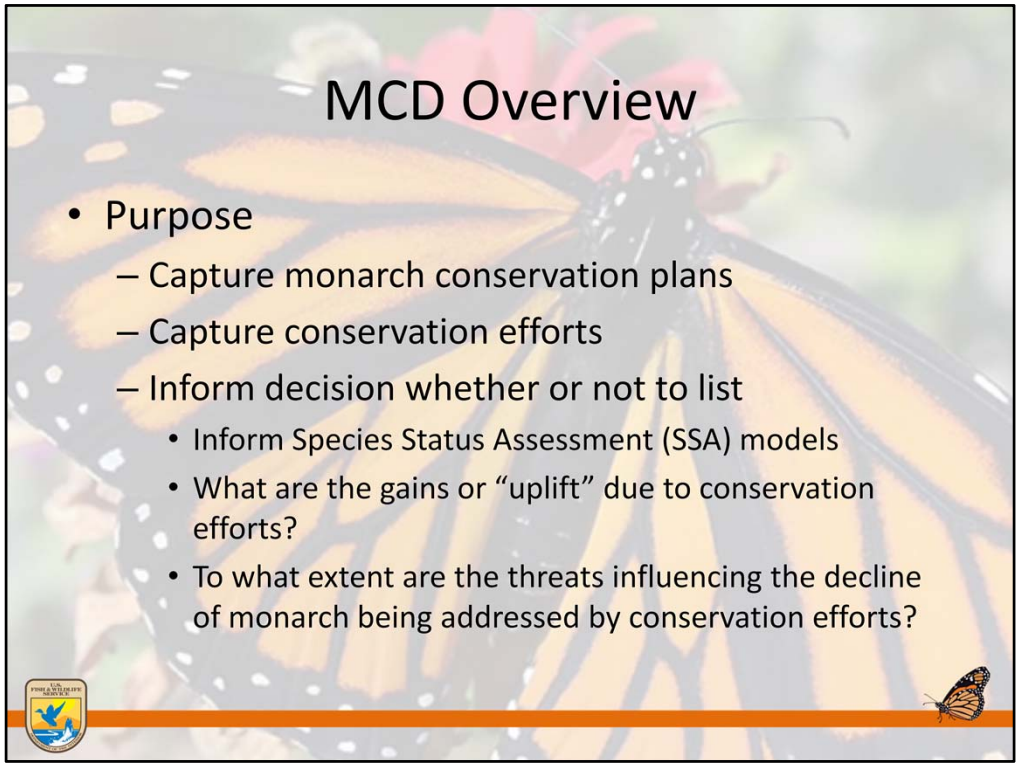


- Hello and thanks for your interest in the U.S. Fish and Wildlife Service's Monarch Conservation Database. My name is Steve Choy and I am leading the development of our database. Before I go any further I want to clarify that this database was originally called the "Monarch Conservation EFFORTS Database," but we have since shortened the title to Monarch Conservation Database, or MCD for short. Also, as a quick reminder, this webinar is the first in a series of technical webinars to discuss the MCD. Following each webinar, we will post PDF versions of the presentation and script online.

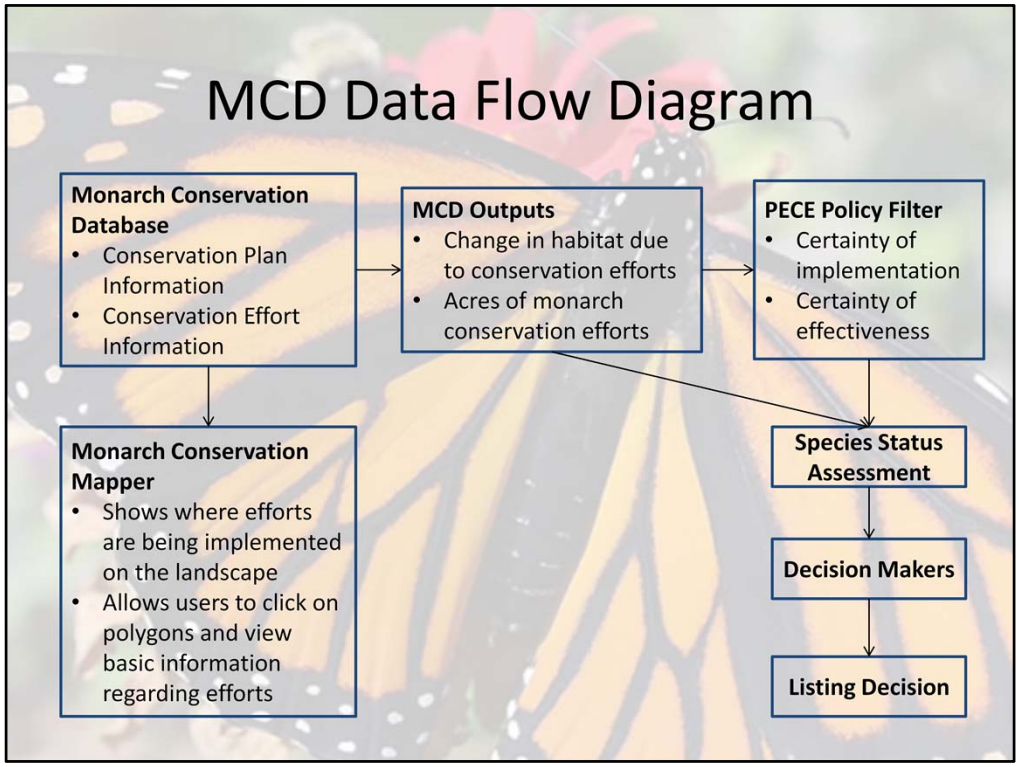


- For today's webinar, I'll review the main purpose of the MCD, including what we're hoping to capture and why we need the MCD. Next, I'll cover fields (or inputs) and outputs of the database, and finally, I'll take us through our initial approach for analyzing the database inputs to get database outputs. Last but not least, we would like to solicit any feedback you may have on the components and features of the database. None of the information I am presenting today is final and we would welcome any opportunities to collaborate with you to improve the functionality of the database.



- The overarching purpose of the Monarch Conservation Database is to capture information about as many monarch conservation plans and efforts as we can to inform the decision on whether or not to list monarch butterflies.
- The important distinction between conservation plans and efforts is that monarch conservation plans are guidance documents and are not considered on-the-ground actions. Conservation efforts are specific on-the-ground actions that are implemented with the intent of, in this case, protecting, enhancing, or creating monarch habitat. Conservation plans and efforts can be related in that conservation plans may be used to guide how conservation efforts are implemented. We would like to capture information on both.
- Using information entered into the database, we will be able better clarify what the current landscape looks like and predict what future conditions may look like for monarchs. This will be a key input into the Species Status Assessment. Ultimately, the questions we are trying to answer using the database are "what are the gains or "uplift" due to conservation efforts" and "to what extent are the threats influencing

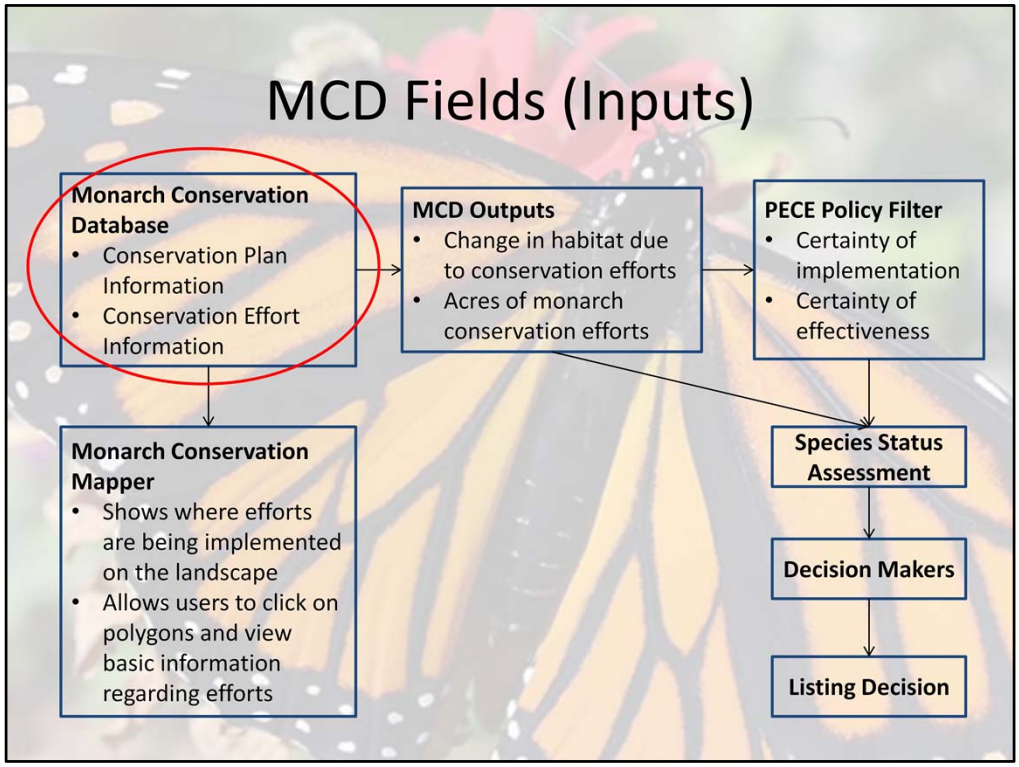
the decline in monarchs being addressed by conservation efforts?”



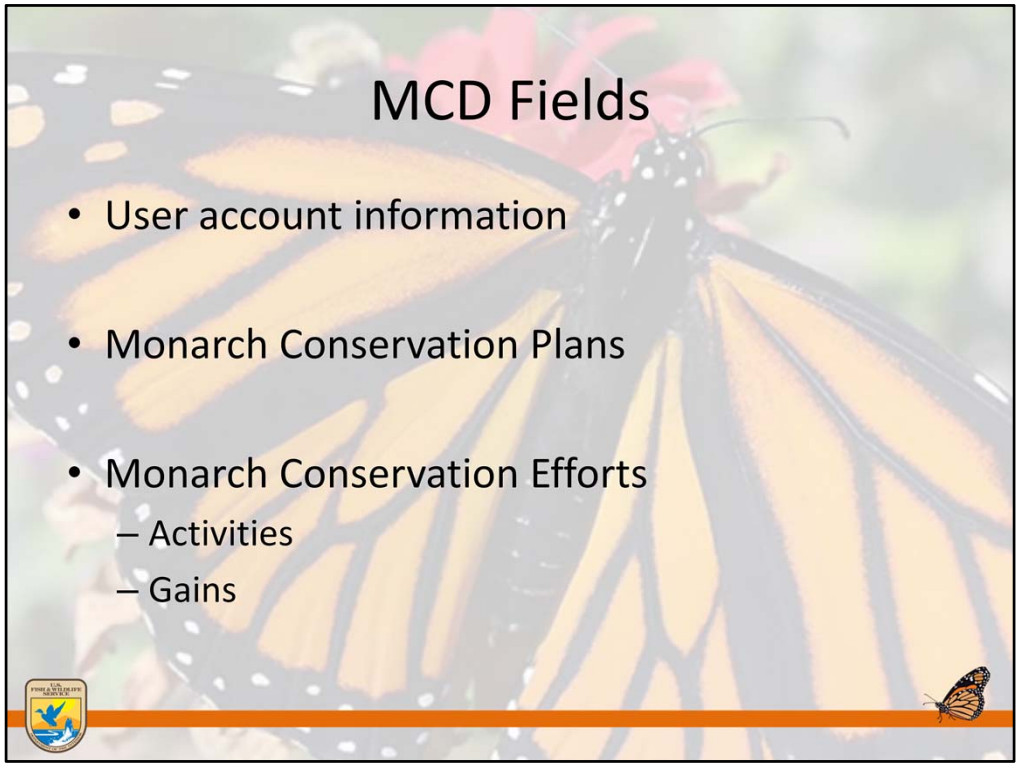
- This data flow diagram is a visual depiction of how information entered into the database (represented by the box in the upper left hand corner) will be used to inform our products, including the Monarch Conservation Mapper and listing decision.
- The Monarch Conservation Mapper is going to be a publicly accessible web-based application to show where conservation is taking place on the landscape and will allow users to click on features to view data. Currently, our strategy is to aggregate data by county and allow map users to view information at that scale.
- The path for information to get from the database to the listing decision involves a few more steps: we first have to analyze the inputs to get outputs. Then, depending on the timing and status of the effort in question, the information may need to be evaluated through the Policy for Evaluating Conservation Efforts (or PECE Policy) before being factored into the Species Status Assessment. PECE Policy evaluates efforts for certainty of implementation and certainty of effectiveness. The efforts that will need to be evaluated by the PECE Policy are those that have only recently been implemented or those that are yet to be

implemented. Efforts that have already been completed or are ongoing will not need to be evaluated by PECE.

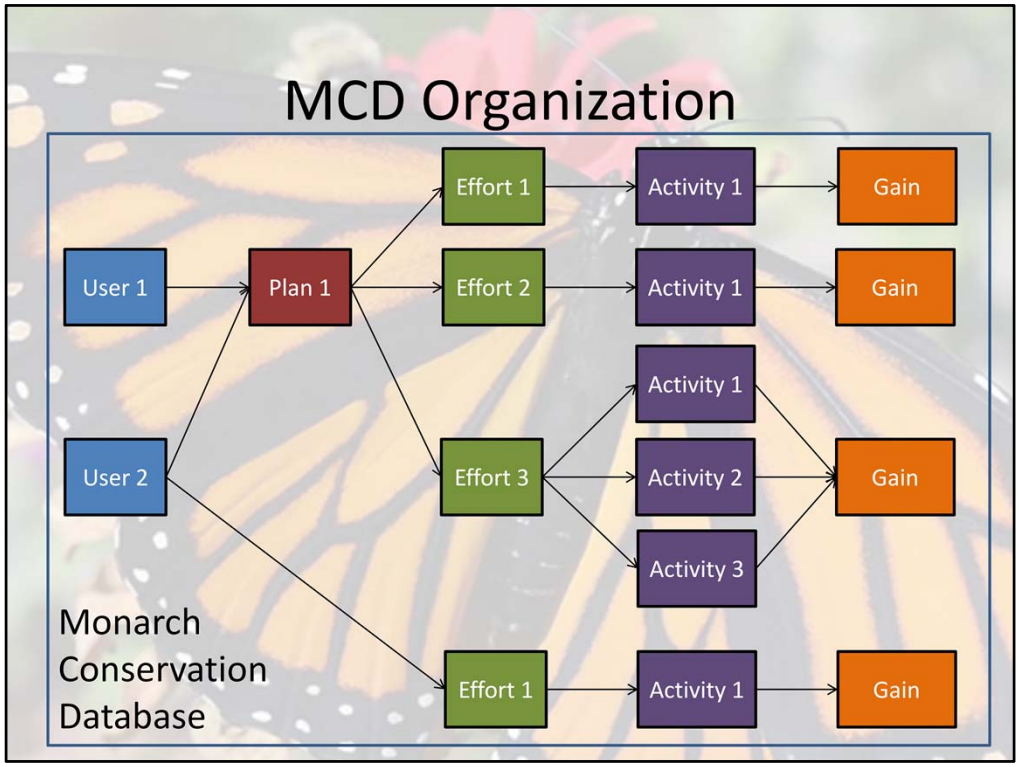
- Database outputs then get turned into inputs for the Species Status Assessment and the results are evaluated by decision makers who make the listing decision.



- Now, we'll focus on the inputs of the MCD



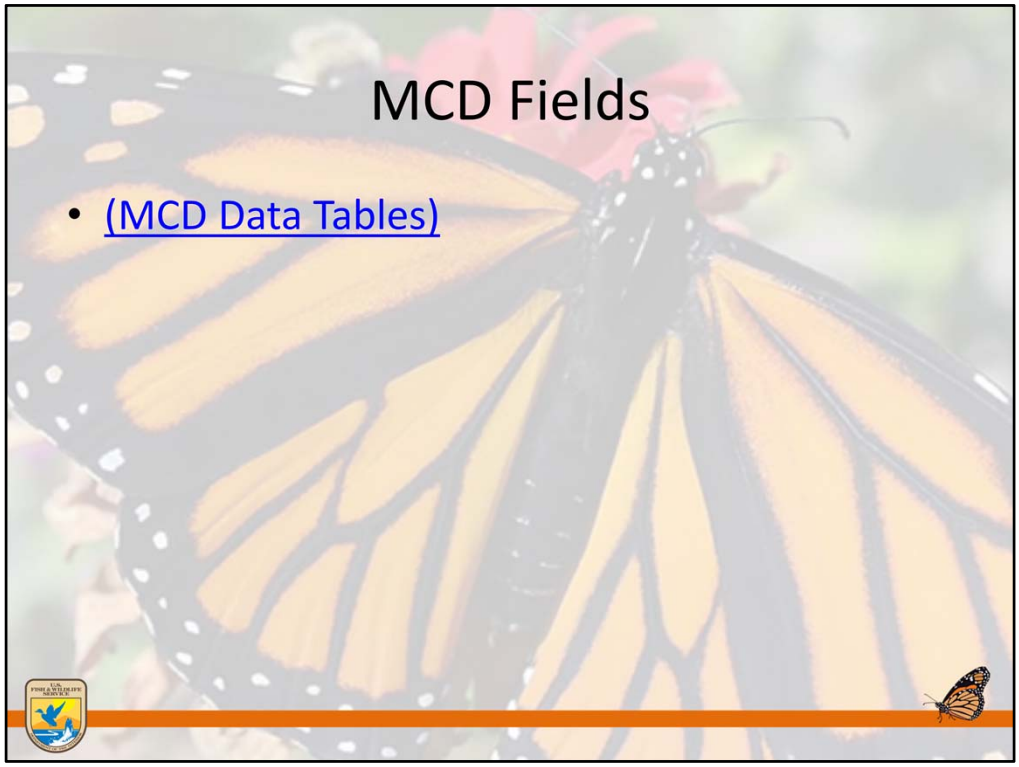
- We'll be asking for 3 categories of data from users: user account information, monarch conservation plan information and monarch conservation effort information, including specific activities and aggregated gains.
- We will require individuals who would like to enter information into, or query the MCD to request access and provide basic information about themselves. We will limit how much personally identifiable information we require; the main goal of the user verification is accountability.



- This MCD Organization diagram is meant to show how our groups of inputs are related.
- The simplest example is shown across the top row: a user may be the U.S. Fish and Wildlife Service. The Service may enter a plan called "National Monarch Conservation Strategy." Using that plan as guidance, the Service may implement an effort on Necedah National Wildlife Refuge in Wisconsin. The specific activity implemented was planting additional milkweed stems on 50 acres of grassland habitat. The resulting gain may be provided by the user if they have measured milkweed resources before and after implementation of the effort, or the gain will be calculated using a proxy from the recent "All Hands On Deck" publication from Thogmartin et al., 2017, published earlier this year.
- The "All Hands on Deck" paper used expert elicitation and literature review to determine estimated milkweed densities on different types of land use sectors in the upper Midwest.

  Thogmartin, W. E., López-Hoffman, L., Rohweder, J., Diffendorfer, J., Drum, R., Semmens, D., ... Wiederholt, R.l (2017). Restoring monarch butterfly habitat in the Midwestern US: 'All hands on deck'. Environmental Research Letters, 12(7), [074005]. DOI: 10.1088/1748-9326/aa7637

- In another, slightly more complex example, say user 2, the Wisconsin Department of Natural Resources also uses the FWS National Monarch Conservation Strategy to implement an effort at Wyalusing State Park, located on the Wisconsin/Iowa boarder. An activity may be implementation of a pollinator friendly mowing plan over 20 acres of managed land, and the gains would be calculated using method I just described.
- You can further see in more complex examples how one effort may have many activities, but they all roll up into one overall gain. Additionally, as you can see by the bottom example, we do not require that efforts be guided by conservation plans, but it is preferable.



- Before we have a closer look at the database fields, I wanted to remind folks that these are not final, and not all of these fields are required. I have been coordinating with a few other agencies and organizations involved in collecting monarch conservation data to develop these initial fields to make sure that we are consistent and maximizing compatibility with other databases. Now, we are looking for your feedback.
- (Exit slideshow to go over access database to see fields)

Table 1. User data table.

QID	Attribute	Format	Required	PII	Definition
UI1	User ID	Auto	Y	N	Unique ID given to all database users
UI2	User Last Name	Text	Y	Y	Last name of database user
UI3	User Name	Text	Y	Y	First name of database user
UI4	User Organization	Text	Y	Y	Organization/affiliation of database user
UI5	User Email	Text	Y	Y	Email address of database user

Table 2. Plan data table.

QID	Attribute	Format	Required	PII	Definition
PL1	User ID	Auto	Y	N	Unique ID given to all database users
PL2	Plan ID	Auto	Y	N	Unique ID given to all plans
PL3	Plan Name	Text	Y	N	Name of plan
PL4	Plan Date	Date/time	Y	N	Date of database entry
PL5	Plan Author	Text/Dropdown Menu	Y	Y	Primary author of conservation plan
PL6	Plan Collaborators	Text/Dropdown Menu	N	Y	Secondary authors of conservation plan
PL7	Plan Approved	Y/N	Y	N	Is the plan approved
PL8	Plan Approved Date	Date/time	N	N	Date of approval of plan
PL9	Plan Conservation Unit	Dropdown Menu	Y	N	Conservation units that are covered in plan
PL10	Plan State	Dropdown Menu	Y	N	States covered in plan
PL11	Plan County	Dropdown Menu	Y	N	Counties covered in plan
PL12	Plan Objectives	Text	Y	N	Overall/major objectives described by the plan
PL13	Plan Threats	Check Box	Y	N	Threats described by plan
PL14	Plan Activities	Check Box	Y	N	Conservation activities described by plan
PL15	Plan Notes	Text	N	N	Any other information regarding plan
PL16	Plan Attachments	Document Upload	N	N	Option to upload any plan documents

Table 3. Effort data table.

QID	Attribute	Format	Required	PII	Definition
EF1	User ID	Auto	Y	N	Unique ID given to all database users
EF2	Effort ID	Auto	Y	N	Unique ID given to all efforts
EF3	Effort Name	Text	Y	N	Name of effort
EF4	Effort Date	Date/time	Y	N	Date of database entry
EF5	Effort Implementer	Text/Dropdown Menu	Y	Y	Name of party implementing effort
EF6	Effort Collaborators	Text/Dropdown Menu	N	Y	Other parties assisting with effort
EF7	Effort Conservation Unit	Dropdown Menu	Y	N	Conservation unit(s) in which the effort is being implemented
EF8	Effort State	Dropdown Menu	Y	N	State(s) in which the effort is being implemented
EF9	Effort County	Dropdown Menu	Y	N	County(ies) in which the effort is being implemented
EF10	Effort Land Ownership	Dropdown Menu	Y	Y	Is effort being implemented on publicly or privately owned land
EF11	Effort Ag Adjacent	Y/N	Y	N	Is the effort area immediately adjacent to an agricultural field
EF12	Effort Acres	Number	Y	N	What is the overall footprint of the effort
EF13	Effort Plan	Y/N	Y	N	Is the effort being implemented under an approved plan
EF14	Effort Plan Name	Dropdown Menu	Y	N	Name of plan underneath which effort is being implemented
EF15	Effort Objectives	Text	Y	N	What are the overall/major objectives of the effort
EF16	Effort Start	Date/time	Y	N	What was/is the actual/anticipated start date of the effort
EF17	Effort End	Date/time	Y	N	What was/is the actual/anticipated end date of the effort

EF18	Effort Duration	Number	Y	N	How long will the effort be maintained after implementation is complete
EF19	Effort Status	Dropdown Menu	Y	N	What is the most recent implementation status of the effort
EF20	Effort Resources	Y/N	Y	N	The conservation effort, the party(ies) to the agreement or plan that will implement the effort, and the staffing, funding level, funding source and other resources necessary to implement the effort are identified.
EF21	Effort Authority	Y/N	Y	N	The legal authority of the party(ies) to the agreement or plan to implement the formalized conservation effort, and the commitment to proceed with the conservation effort, are described.
EF22	Effort Procedure	Y/N	Y	N	The legal procedural requirements (e.g. environmental review) necessary to implement the effort are described, and information is provided indicating that fulfillment of these requirements does not preclude commitment to the effort.
EF23	Effort Authorizations	Y/N	Y	N	Authorizations (e.g. permits, landowner permission) necessary to implement the conservation effort are identified, and a high level of certainty is provided that the party(ies) to the agreement or plan that will implement the effort will obtain these authorizations.
EF24	Effort Participation	Y/N	Y	N	The type and level of voluntary participation (e.g. the number of landowners allowing entry to their land, or number of participants agreeing to change timber management practices and acreage involved) necessary to implement the conservation effort is identified, and a high level of certainty is provided that the party(ies) to the agreement or plan that will implement the conservation effort will obtain that level of voluntary participation (e.g., an explanation of how incentives to be provided will result in the necessary level of voluntary participation).
EF25	Effort Regulatory	Y/N	Y	N	Regulatory mechanisms (e.g. laws, regulations, ordinances) necessary to implement the conservation effort are in place.
EF26	Effort Funding	Y/N	Y	N	A high level of certainty is provided that the party(ies) to the agreement or plan that will implement the conservation effort will obtain the necessary funding.
EF27	Effort Implementation	Y/N	Y	N	An implementation schedule (including incremental completion dates) for the conservation effort is provided.
EF28	Effort Agreements	Y/N	Y	N	The conservation agreement or plan that includes the conservation effort is approved by all parties to the agreement or plan.

EF29	Effort Shapefile	Data	N	Y	Shapefile representing footprint of effort
EF30	Effort Hide	Y/N	N	N	Does the user wish to hide spatial data from public facing mapper
EF31	Effort Notes	Text	N	N	Any other important notes about the effort
EF32	Effort Documents	Data Upload	N	N	Option to upload any effort documents

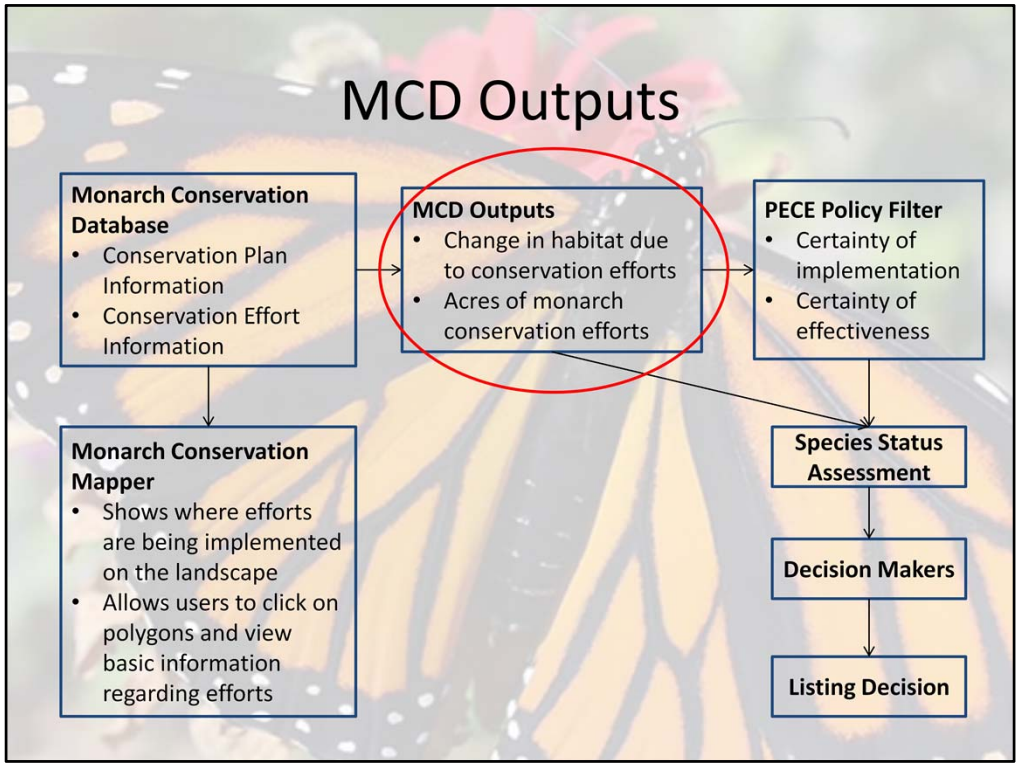
Table 4. Activity data table.

QID	Attribute	Format	Required	PII	Definition
AC1	Activity ID	Auto	Y	N	Unique ID given to each individual activity
AC2	Effort ID	Auto	Y	N	Associates each activity with unique effort
AC3	Activity Name	Dropdown	Y	N	Activity implemented
AC4	Activity Land Use	Dropdown	Y	N	Primary land use type in activity footprint before implementation
AC5	Activity Land Use Change	Y/N	Y	N	Did the land use type in activity footprint change as a result of the activity
AC6	Activity New Land Use	Dropdown	Y	N	Primary land use type in activity footprint after implementation
AC7	Activity Threat	Check Box	Y	N	Threat(s) addressed by activity
AC8	Activity Acres	Number	Y	N	Size of footprint covered by activity
AC9	Activity Objectives	Y/N	Y	N	Explicit incremental objectives for the conservation effort and dates for achieving them are stated.
AC10	Activity Steps	Y/N	Y	N	The steps necessary to implement the conservation effort are identified in detail.
AC11	Activity Measures	Y/N	Y	N	Quantifiable, scientifically valid parameters that will demonstrate achievement of objectives, and standards by which progress will be measured, are identified.
AC12	Activity Monitoring	Y/N	Y	N	Provisions for monitoring and reporting progress on implementation (based on compliance with the implementation schedule) and effectiveness (based on evaluation of quantifiable parameters) of the conservation effort are provided.
AC13	Activity Adaptive	Y/N	Y	N	Principles of adaptive management are incorporated.

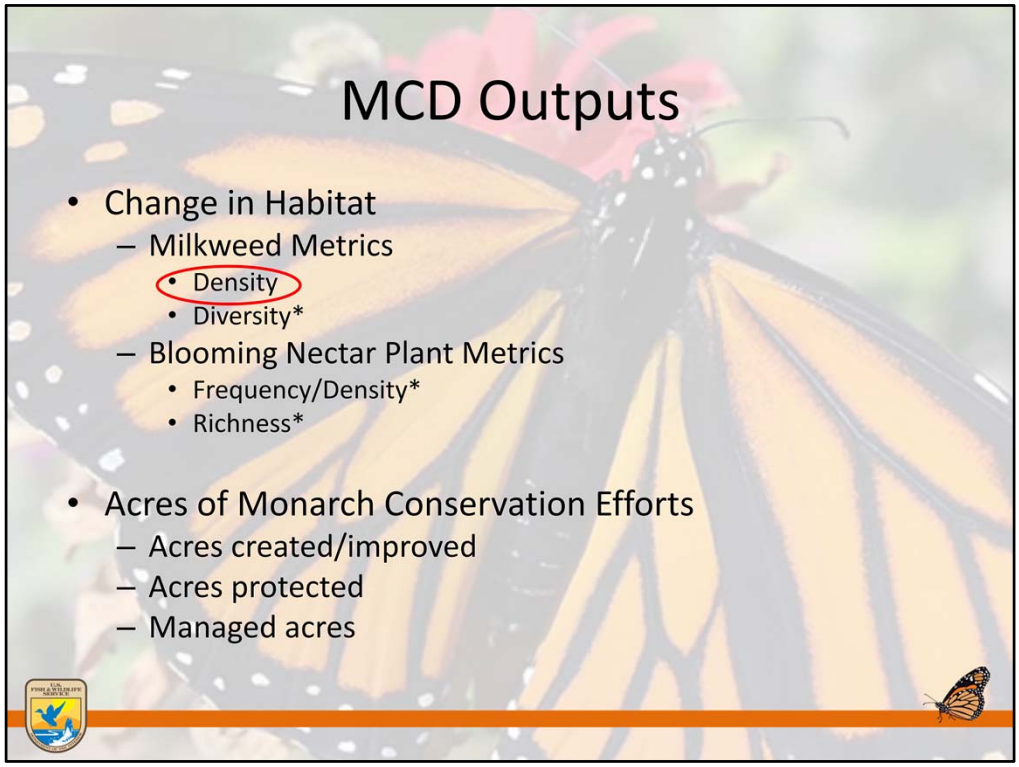
Table 5. Gain data table.

QID	Attribute	Format	Required	PII	Definition
GN1	Baseline Milkweed Density	Number	N	N	If known/applicable; milkweed density (stems/acre) before effort
GN2	Effort Milkweed Density	Number	N	N	If known/applicable; milkweed density (stems/acre) after effort
GN3	Baseline Milkweed Diversity	Number	N	N	If known/applicable; milkweed diversity (species observed) before effort
GN4	Effort Milkweed Diversity	Number	N	N	If known/applicable; milkweed diversity (species observed) after effort
GN5	Baseline Milkweed Proportional Abundance	Y/N	N	N	If known/applicable; does one species of milkweed dominate (>80%) before effort
GN6	Effort Milkweed Proportional Abundance	Y/N	N	N	If known/applicable; does one species of milkweed dominate (>80%) after effort
GN7	Baseline Blooming Nectar Plant Frequency (0.25m plot)	Number	N	N	If known/applicable; blooming nectar plant frequency (%) before effort in a sampled 0.25m plot
GN8	Effort Blooming Nectar Plant Frequency (0.25m plot)	Number	N	N	If known/applicable; blooming nectar plant frequency (%) after effort in a sampled 0.25m plot
GN9	Baseline Blooming Nectar Plant Frequency (0.5m plot)	Number	N	N	If known/applicable; blooming nectar plant frequency (%) before effort in a sampled 0.5m plot
GN10	Effort Blooming Nectar Plant Frequency (0.5m plot)	Number	N	N	If known/applicable; blooming nectar plant frequency (%) after effort in a sampled 0.5m plot
GN11	Baseline Blooming Nectar Plant Frequency (1.0m plot)	Number	N	N	If known/applicable; blooming nectar plant frequency (%) before effort in a sampled 1.0m plot
GN12	Effort Blooming Nectar Plant Frequency (1.0m plot)	Number	N	N	If known/applicable; blooming nectar plant frequency (%) after effort in a sampled 1.0m plot
GN13	Baseline Blooming Nectar Plant Density	Number	N	N	If known/applicable; blooming nectar plant density before effort (plants per m^2)
GN14	Effort Blooming Nectar Plant Density	Number	N	N	If known/applicable; blooming nectar plant density after effort (plants per m^2)
GN15	Baseline Blooming Nectar Plant Richness	Number	N	N	If known/applicable; blooming nectar plant richness (species observed) before effort
GN16	Effort Blooming Nectar Plant Richness	Number	N	N	If known/applicable; blooming nectar plant richness (species observed) after effort
GN17	Effort Survey Protocol	Dropdown	N	N	Protocol used to measure nectar resources

		Menu			
GN18	Effort Survey Date (Baseline)	Date	N	N	Date baseline nectar resources survey conducted (if applicable)
GN19	Effort Survey Date (Post)	Date	N	N	Date post-effort nectar resources survey conducted (if applicable)

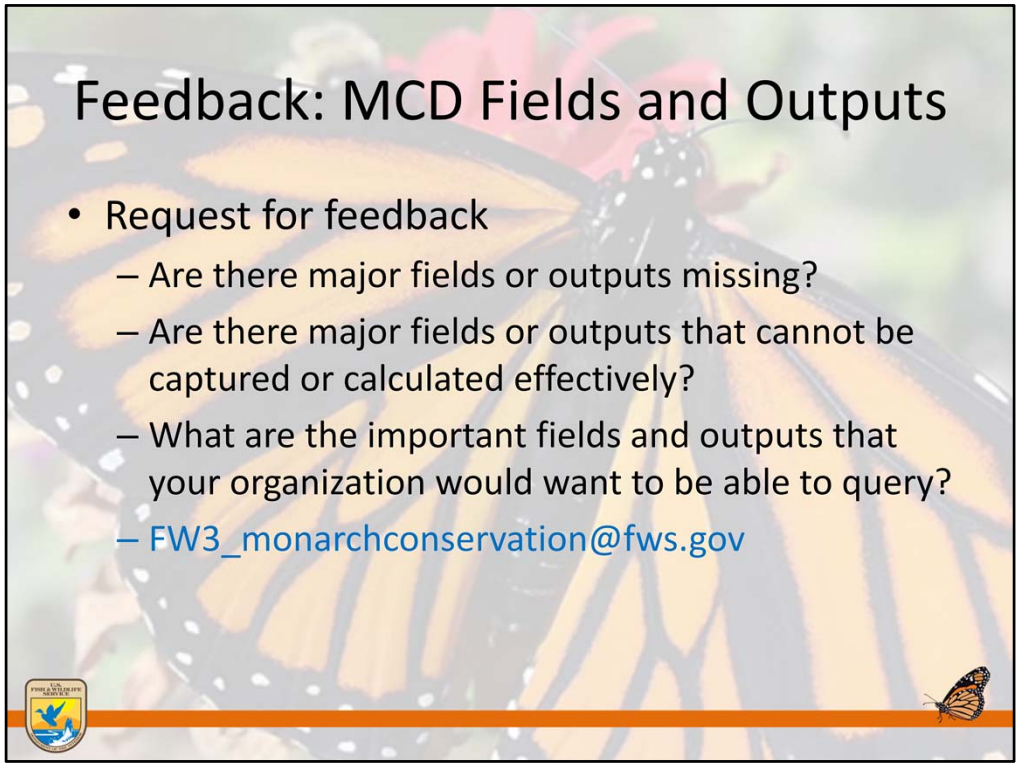


- Now that we've covered the inputs, let's discuss the outputs, or in other words, what information are we trying to derive from the inputs.

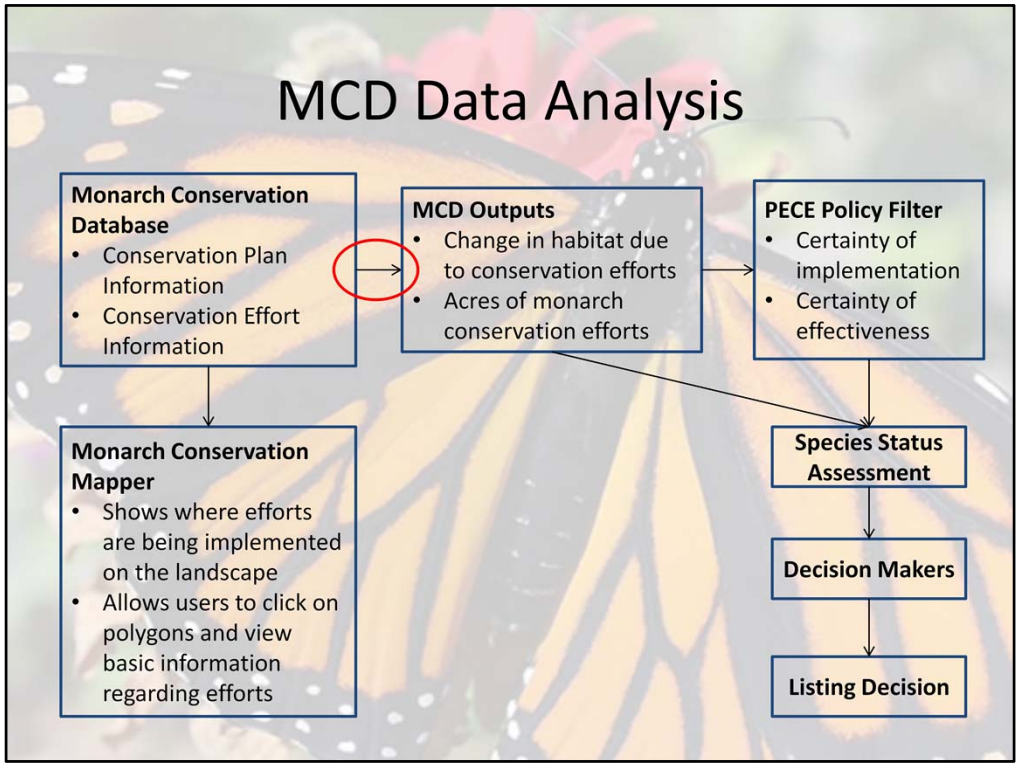


- Generally, we are trying to assess change in habitat as a result of everyone's efforts. Because we currently have a better understanding of milkweed density in terms of its relationship to monarch production and how much milkweed there is on the landscape, our initial focus will be on milkweed. In essence, our current proxy for habitat is milkweed density. However, as we just saw, the database will also be able to collect information on other nectar resource metrics if they are available from the user, such as blooming nectar plant frequency or density and richness.
- These additional milkweed and nectar resource metrics were chosen to be consistent with other databases and conservation efforts such as the Monarch Joint Venture's national protocol as well as the Environmental Defense Fund's Habitat Quantification Tool. They are also compatible with current state planning efforts that we are aware of, but, to reiterate, we will be keying in on changes in milkweed density for our initial analysis.
- In addition to milkweed and nectar resources, we would like to be able to tally the amount of acres created or improved, protected, and

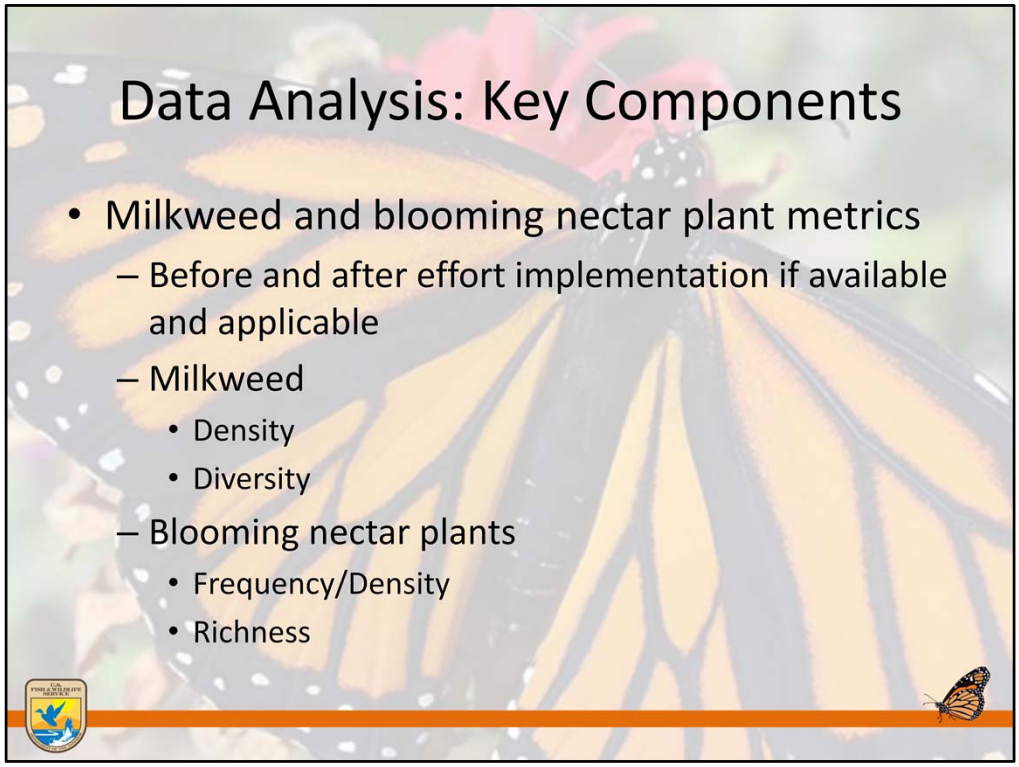
managed to quantify the amount of conservation that is occurring on the landscape and estimate the extent to which threats are being addressed by conservation efforts.



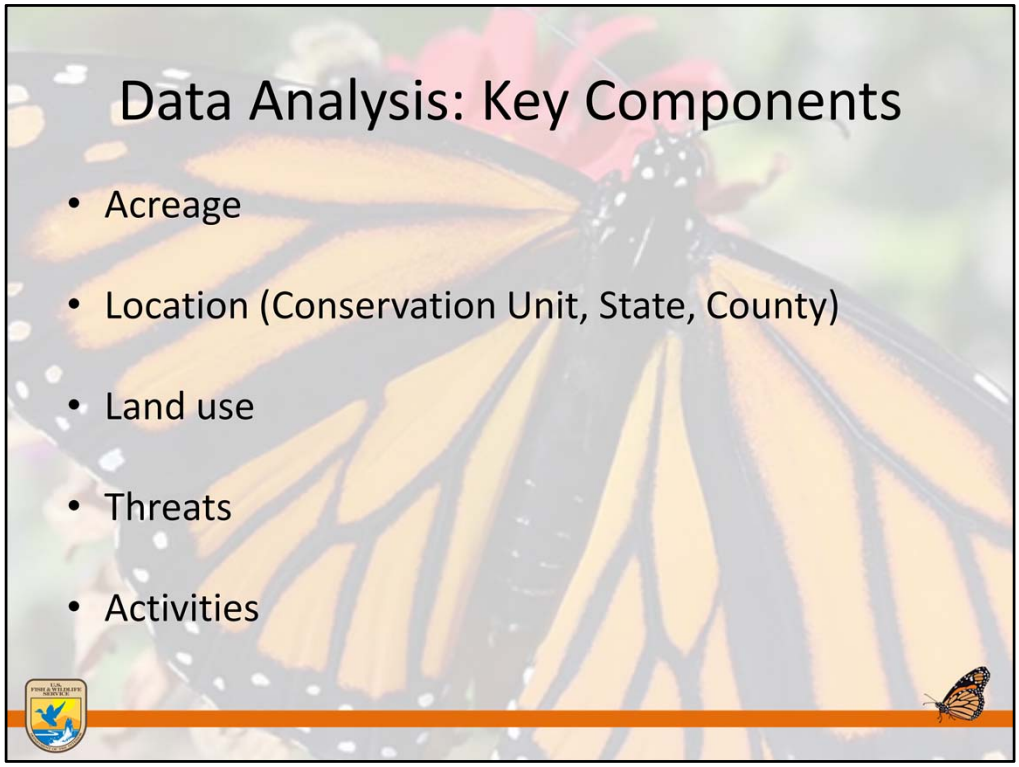
- At this point, I'd like to put out our first call for feedback. We are hoping that you, as potential database users, will be willing and able to review the major fields and outputs and let us know if you believe that we have missed anything, or if you believe there is information we're asking for that cannot realistically be captured or calculated efficiently and effectively, and along those lines, we'd like to know what the most important fields and outputs are for you or your organization to be able to query from this database.
- At the end of this presentation, we'll have a few minutes for a question and answer session, and I will also provide an email address for you to be able to send questions, comments and ideas to at the conclusion of this webinar.



- Moving on, let's go back and discuss the key components of our data analyses and how we'll move from the inputs to those outputs we just discussed.



- They key components in our data analysis include the milkweed and blooming nectar plant metrics. If available and applicable, we are looking for numbers before and after implementation in order to calculate the net gain. Remember, our focus will be on milkweed density initially, even though the database will be able to collect milkweed diversity and blooming nectar plant frequency or density and richness.



- Additional key components are
  - The acreage of the overall effort and individual activities
  - The location
    - Spatially explicit data in the form of shapefiles is preferred, but at a minimum, we would like to have conservation unit, state and county
    - We are also considering a feature that would allow users to draw their own maps via the user interface if they do not have access to ArcMap
  - We also need to know the land use within the footprint of the effort, which will be used to calculate milkweed density if user data is not available
  - Finally, we need to know the threats that the effort is intended to address, which must be relevant to the geographic location of the effort as well as the land use, and
  - The specific activity implemented, which of course have to be relevant to the threat being addressed

- The link between threats and activities is an important one for how we document efforts. We are trying to minimize the number of open text boxes to get consistent information from users. People will be able to choose from pre-determined threats and activities for consistency and to help us determine the effectiveness of an effort, since we would be limiting the selection to only activities that have proven to be effective in the field.
- I'll briefly exit the slideshow so we can have a look at the threats and activities table.
  - (Exit slideshow to show threats and activities matrix)
  - The threats and activities table depicts land use sector specific threats, and corresponding activities that would be appropriate to implement to address the threat. For example, for the grassland land use sector, a threat or limiting factor would be "lack of nectar resources." Potential activities that would help to address this threat or limiting factor may be increasing milkweed, increasing blooming nectar plants, or possibly both, in addition to implementing pollinator friendly grazing, mowing, or prescribed

burn plans. Finally, for each activity, there is an associated gain. The blooming nectar plant gain is starred because, while we would like to calculate this gain, we are totally reliant on user provided data to do so, unlike milkweed where we can use expert elicited data to fill-in the blanks. So, we may or may not be able to evaluate gains in blooming nectar plant resources for our initial data analysis.

- Unfortunately, we do not have enough time to go through each of the scenarios, so I'm going to get back into the presentation.

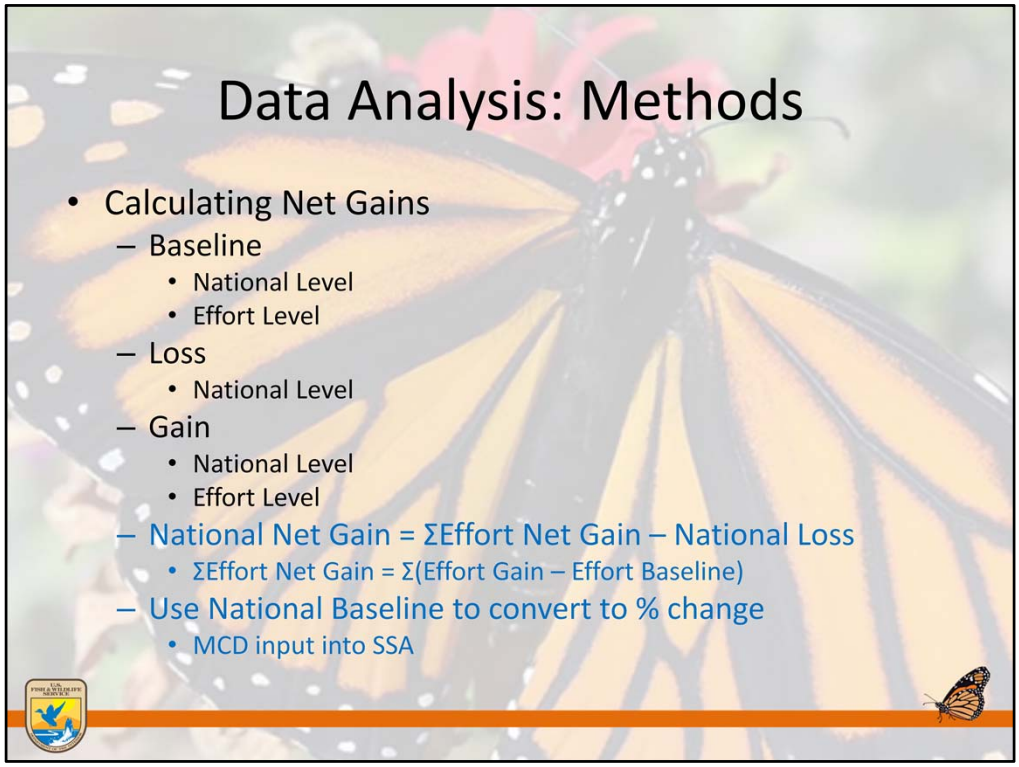
Monarch Conservation Database Fields - Threats and Activities to Address Threats

Classification (Thogmartin et al. 2017)	Estimated Basline Milkweed Density (Thogmartin et al. 2017)	General Classification	Threat	Activity	Gain
22 - Developed Low Intensity (NLCD) WITHIN URBAN	0.00	Developed	Lack of Nectar Resources (General)	Increase Milkweed	Milkweed
23 - Developed Med Intensity (NLCD)	0.00				Acres Created/Improved
24 - Developed High Intensity (NLCD)	0.00			Increase Blooming Nectar Plants	Blooming Nectar Plants*
26 - Developed Low Intensity (NLCD) EXURBAN	1.00				Acres Created/Improved
21 - Developed Open Space (NLCD) Linear	0.00			Increase Milkweed and Blooming Nectar Plants	Milkweed
25 - Developed Open Space (NLCD) Core	0.00				Blooming Nectar Plants*
					Acres Created/Improved
			Loss of Habitat Quality (Insecticide Use)	TBD	
			Loss of Nectar Resources (Pesticide Drift - Herbicides)		
			Loss of Habitat Quality (Pesticide Drift - Insecticides)		
120 - TIGER Secondary Roads	57.15	Roads	Lack of Nectar Resources (General)	Increase Milkweed	Milkweed
110 - TIGER Primary Roads and Ramps	57.15				Acres Created/Improved
140 - TIGER Local Roads	57.15			Increase Blooming Nectar Plants	Blooming Nectar Plants*
174 - TIGER Private Roads	3.09				Acres Created/Improved
180 - All TIGER Roads (Inside Urban Areas)	0.00			Increase Milkweed and Blooming Nectar Plants	Milkweed
					Blooming Nectar Plants*
					Acres Created/Improved
			Loss of Nectar Resources (Herbicide Use)	TBD	
			Loss of Nectar Resources (Pesticide Drift - Herbicides)		
			Loss of Habitat Quality (Pesticide Drift - Insecticides)		
			Loss of Nectar Resources (Mowing Practices)	Pollinator Mowing Plan	Milkweed
					Blooming Nectar Plants*
					Acres Created/Improved
31 - Barren (NLCD)	0.00	Barren	Lack of Nectar Resources (General)	Increase Milkweed	Milkweed
					Acres Created/Improved
				Increase Blooming Nectar Plants	Blooming Nectar Plants*
					Acres Created/Improved
				Increase Milkweed and Blooming Nectar Plants	Milkweed
					Blooming Nectar Plants*
					Acres Created/Improved
			Loss of Nectar Resources (Pesticide Drift - Herbicides)	TBD	
			Loss of Habitat Quality (Pesticide Drift - Insecticides)		
41 - Deciduous Forest (NLCD)	0.00	Forest	Lack of Nectar Resources (General)	Increase Milkweed	Milkweed
42 - Evergreen Forest (NLCD)	0.00				Acres Created/Improved
43 - Mixed Forest (NLCD)	0.00			Increase Blooming Nectar Plants	Blooming Nectar Plants*
					Acres Created/Improved
				Increase Milkweed and Blooming Nectar Plants	Milkweed
					Blooming Nectar Plants*
					Acres Created/Improved
				Open Canopy	Milkweed
					Blooming Nectar Plants*
					Acres Created/Improved
			Deforestation	Habitat Protection	Acres Protected
			Loss of Nectar Resources (Pesticide Drift - Herbicides)	TBD	
			Loss of Habitat Quality (Pesticide Drift - Insecticides)		
98 - CRP Non Wet	112.14	CRP	Lack of Nectar Resources (General)	Increase Milkweed	Milkweed
99 - CRP Wet	61.37				Acres Created/Improved
				Increase Blooming Nectar Plants	Blooming Nectar Plants*
					Acres Created/Improved
				Increase Milkweed and Blooming Nectar Plants	Milkweed
					Blooming Nectar Plants*
					Acres Created/Improved
			Lack of Management	Pollinator Management Plan	Milkweed
					Blooming Nectar Plants*
					Acres Created/Improved
			Land Conversion	Keep Enrolled in CRP	Acres Protected
			Loss of Nectar Resources (Pesticide Drift - Herbicides)	TBD	
			Loss of Habitat Quality (Pesticide Drift - Insecticides)		
76 - Grassland (NLCD)	3.09	Grassland	Lack of Nectar Resources (General)	Increase Milkweed	Milkweed
77 - Grassland (NLCD) PADUS Protected	3.09				Acres Created/Improved
				Increase Blooming Nectar Plants	Blooming Nectar Plants*
					Acres Created/Improved
				Increase Milkweed and Blooming Nectar Plants	Milkweed
					Blooming Nectar Plants*
					Acres Created/Improved
				Pollinator Grazing Plan	Milkweed
					Blooming Nectar Plants*
					Acres Created/Improved
				Pollinator Mowing Plan	Milkweed
					Blooming Nectar Plants*
					Acres Created/Improved
				Pollinator Prescribed Burn Plan	Milkweed
					Blooming Nectar Plants*
					Acres Created/Improved
			Land Conversion	Land Protection	Acres Protected
			Loss of Nectar Resources (Pesticide Drift - Herbicides)	TBD	
			Loss of Habitat Quality (Pesticide Drift - Insecticides)		
100 - HSIP Transmission Line (Outside Urban Areas)	3.09		Lack of Nectar Resources (General)	Increase Milkweed	Milkweed
101 - HSIP Transmission Line (Inside Urban Areas)	0.00				Acres Created/Improved
				Increase Blooming Nectar Plants	Blooming Nectar Plants*
					Acres Created/Improved
				Increase Milkweed and Blooming Nectar Plants	Milkweed
					Blooming Nectar Plants*

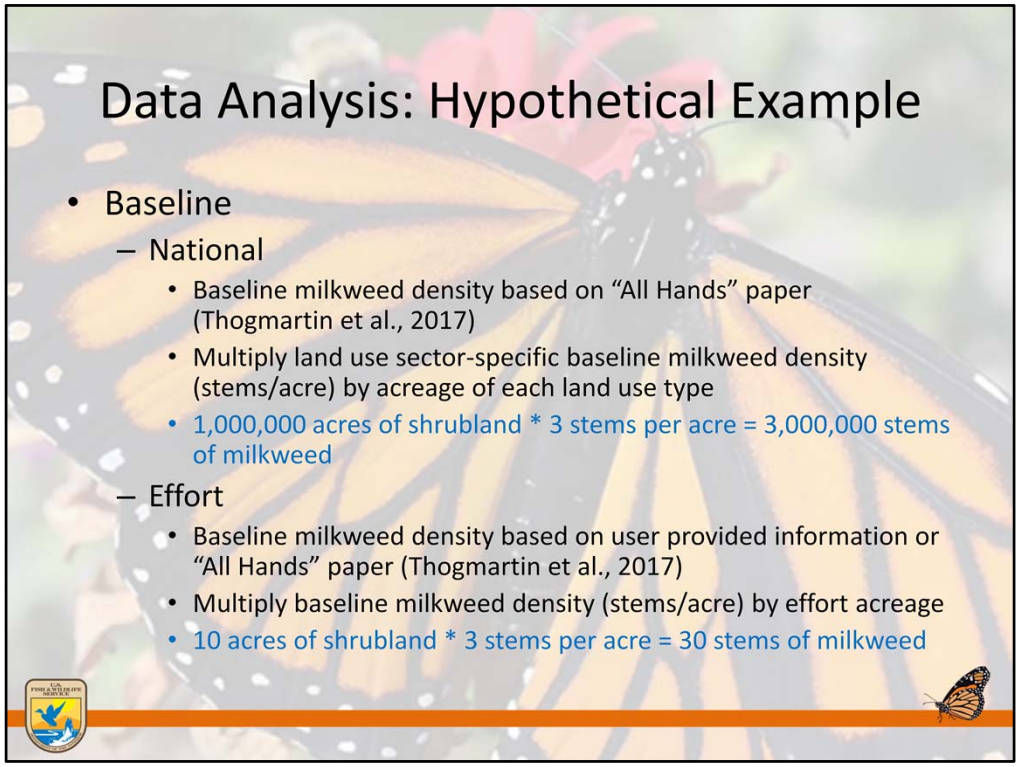
		Transmission Line ROW			Acres Created/Improved
			Loss of Nectar Resources (Herbicide Use)	TBD	
			Loss of Nectar Resources (Pesticide Drift - Herbicides)		
			Loss of Habitat Quality (Pesticide Drift - Insecticides)		
			Loss of Nectar Resources (Mowing practices)	Pollinator Mowing Plan	Milkweed
					Blooming Nectar Plants*
					Acres Created/Improved
200 - TIGER Rails (Outside Urban Areas)	3.09	Rail Line ROW	Lack of Nectar Resources (General)	Increase Milkweed	Milkweed
201 - TIGER Rails (Inside Urban Areas)	0.00				Acres Created/Improved
				Increase Blooming Nectar Plants	Blooming Nectar Plants*
					Acres Created/Improved
				Increase Milkweed and Blooming Nectar Plants	Milkweed
					Blooming Nectar Plants*
					Acres Created/Improved
			Loss of Nectar Resources (Herbicide Use)	TBD	
			Loss of Nectar Resources (Pesticide Drift - Herbicides)		
			Loss of Habitat Quality (Pesticide Drift - Insecticides)		
			Loss of Nectar Resources (Mowing practices)	Pollinator Mowing Plan	Milkweed
					Blooming Nectar Plants*
					Acres Created/Improved
52 - Shrubland (NLCD)	3.09	Shrubland	Lack of Nectar Resources (General)	Increase Milkweed	Milkweed
					Acres Created/Improved
				Increase Blooming Nectar Plants	Blooming Nectar Plants*
					Acres Created/Improved
				Increase Milkweed and Blooming Nectar Plants	Milkweed
					Blooming Nectar Plants*
					Acres Created/Improved
				Pollinator Grazing Plan	Milkweed
					Blooming Nectar Plants*
					Acres Created/Improved
				Pollinator Mowing Plan	Milkweed
					Blooming Nectar Plants*
					Acres Created/Improved
				Pollinator Prescribed Burn Plan	Milkweed
					Blooming Nectar Plants*
					Acres Created/Improved
			Land Conversion	Land Protection	Acres Protected
			Loss of Nectar Resources (Pesticide Drift - Herbicides)	TBD	
			Loss of Habitat Quality (Pesticide Drift - Insecticides)		
1 - Corn LOW	0.05	Cropland	Lack of Nectar Resources (General)	Increase Milkweed	Milkweed
14 - Soybeans LOW	0.05				Acres Created/Improved
3 - Other Crops (CDL) LOW	3.09			Increase Blooming Nectar Plants	Blooming Nectar Plants*
4 - Other Crops (CDL) MEDIUM	5.30				Acres Created/Improved
5 - Other Crops (CDL) HIGH	7.50			Increase Milkweed and Blooming Nectar Plants	Milkweed
6 - Fallow Idle (CDL) HIGH	3.09				Blooming Nectar Plants*
7 - Fruit Xmas Trees Vines (CDL) LOW	3.09				Acres Created/Improved
8 - Fruit Xmas Trees Vines (CDL) MEDIUM	5.30				
9 - Fruit Xmas Trees Vines (CDL) HIGH	7.50				
2 - Corn LOW (Marginal)	0.05				
15 - Soybeans LOW (Marginal)	0.05				
			Loss of Nectar Resources (Herbicide Use)	TBD	
			Loss of Habitat Quality (Insecticide Use)		
			Loss of Nectar Resources (Pesticide Drift - Herbicides)		
			Loss of Habitat Quality (Pesticide Drift - Insecticides)		
			Loss of Nectar Resources (Haying practices)	Pollinator Haying Plan	Milkweed
					Blooming Nectar Plants*
					Acres Created/Improved
			Loss of Nectar Resources (Conversion of Alfalfa to non-nectar crops)	Keep as Alfalfa	Managed Acres
10 - Hay Alfalfa (CDL) LOW	0.00	Hay/Pasture	Lack of Nectar Resouces (General)	Increase Milkweed	Milkweed
78 - Pasture (NLCD)	3.09				Acres Created/Improved
79 - Pasture (NLCD) PADUS Protected	3.09			Increase Blooming Nectar Plants	Blooming Nectar Plants*
					Acres Created/Improved
				Increase Milkweed and Blooming Nectar Plants	Milkweed
					Blooming Nectar Plants*
					Acres Created/Improved
			Loss of Nectar Resources (Herbicide Use)	TBD	
			Loss of Nectar Resources (Pesticide Drift - Herbicides)		
			Loss of Habitat Quality (Pesticide Drift - Insecticides)		
			Loss of Nectar Resources (Mowing practices)	Pollinator Mowing Plan	Milkweed
					Blooming Nectar Plants*
					Acres Created/Improved
			Loss of Nectar Resources (Grazing practices)	Pollinator Grazing Plan	Milkweed
					Blooming Nectar Plants*
					Acres Created/Improved
			Loss of Nectar Resources (Haying practices)	Pollinator Haying Plan	Milkweed
					Blooming Nectar Plants*
					Acres Created/Improved
95 - Herbaceous Wetlands (NLCD)	0.00	Wetlands	Lack of Nectar Resoures (General)	Increase Milkweed	Milkweed
90 - Woody Wetlands (NLCD)	0.00				Created/Improved Acres
				Increase Blooming Nectar Plants	Blooming Nectar Plants*
					Created/Improved Acres
				Increase Milkweed and Blooming Nectar Plants	Milkweed
					Blooming Nectar Plants*
					Created/Improved Acres
				Drawdown	Milkweed
					Blooming Nectar Plants*

				Created/Improved Acres
			Loss of Nectar Resources (Pesticide Drift - Herbicides)	TBD
			Loss of Habitat Quality (Pesticide Drift - Insecticides)	

- As with the fields and outputs, we welcome your feedback on the threats and activities table. We would especially be interested to know if there are threats we haven't thought about and if are there activities that your organization is planning on implementing that are not captured in the table. Additionally, should we be considering more gains? Again, we will have a Q and A session in just a few minutes after the presentation is over, and I will provide contact information if we do not get to your specific question or comment today.

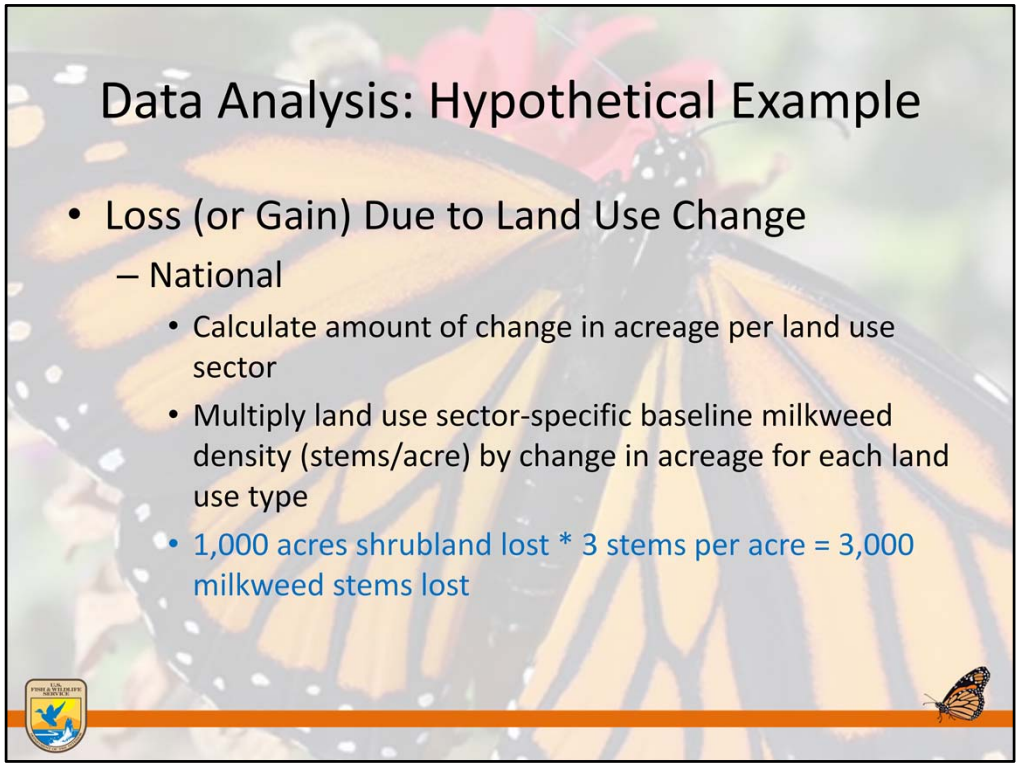


- Now that we know the principle components of the data analysis, we can talk about methods of data analysis.
- There are three components we need to calculate the net gains
  - We need to know the baseline at the national and individual effort level
  - The loss at the national level, and
  - The gains at the national and individual effort level
- The national net gain formula is: the sum of the net gains of individual efforts minus the national loss, where the sum of the net gains of individual effort is the sum of all of the total gains for each individual effort minus the baseline of each individual effort.
- Then, we use the national baseline to calculate to a percent change. The percent change in milkweed due to efforts is the principle database input into the species status assessment models.

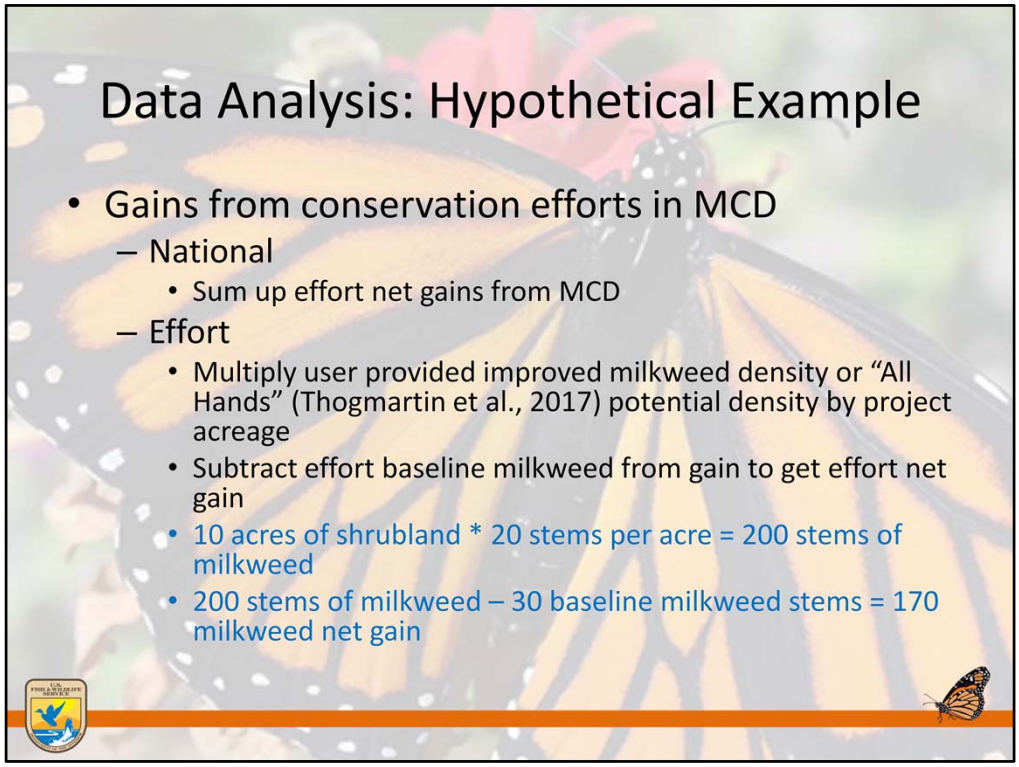


- Using milkweed stems as an example, to calculate the national baseline for milkweed stems, we are relying on the "All Hands On Deck" paper by Thogmartin et al., 2017 to multiply the national acreage of an individual land use sector by the estimated milkweed density for that land use sector.
- Let's say there's a million acres of shrubland nationally. The estimated number of milkweed stems in the shrubland land use sector from the "All Hands On Deck" paper is 3 stems per acre. Three times a million gives you 3 million stems of milkweed from shrubland nationally. We would repeat this process for all land use sectors and sum to get the total national baseline for milkweed stems.
- For the individual effort level baseline, we use the same methodology except we can use user provided milkweed density or "All Hands On Deck" data if user data is not available.
- You would multiply the acreage of the effort by the baseline milkweed density; in other words, the milkweed density before implementation of the effort.
- For example, if an effort was implemented on 10 acres of shrubland,

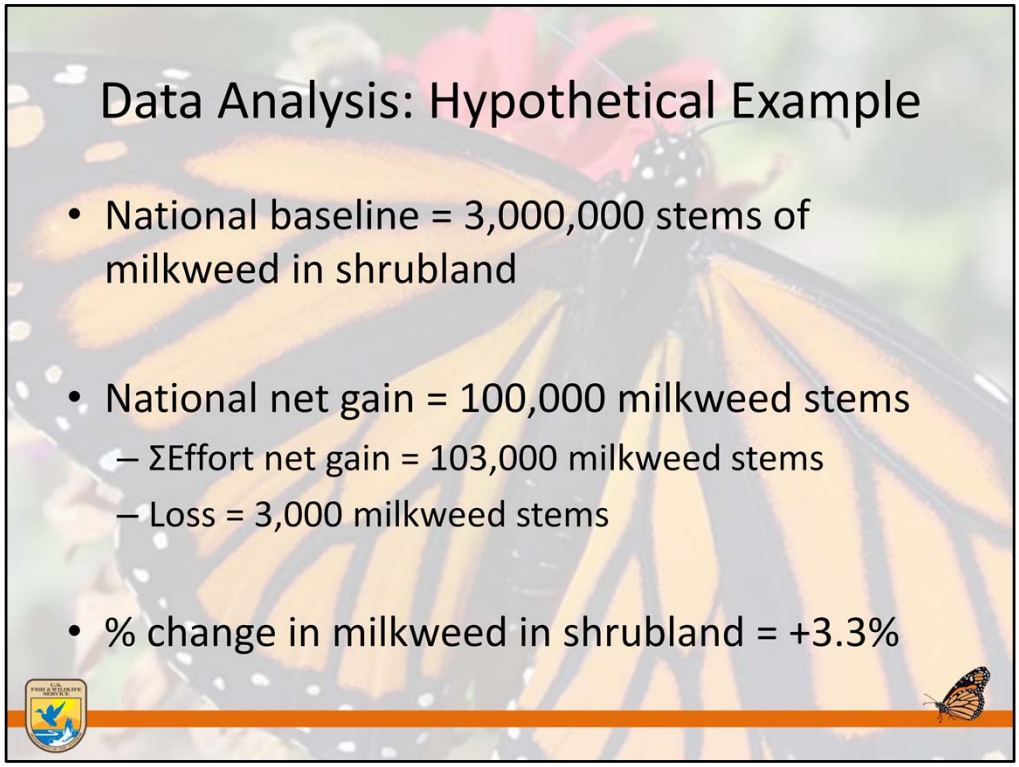
multiply that by the baseline 3 stems per acre from “All Hands On Deck,” which equals 30 stems of milkweed as our individual effort baseline.



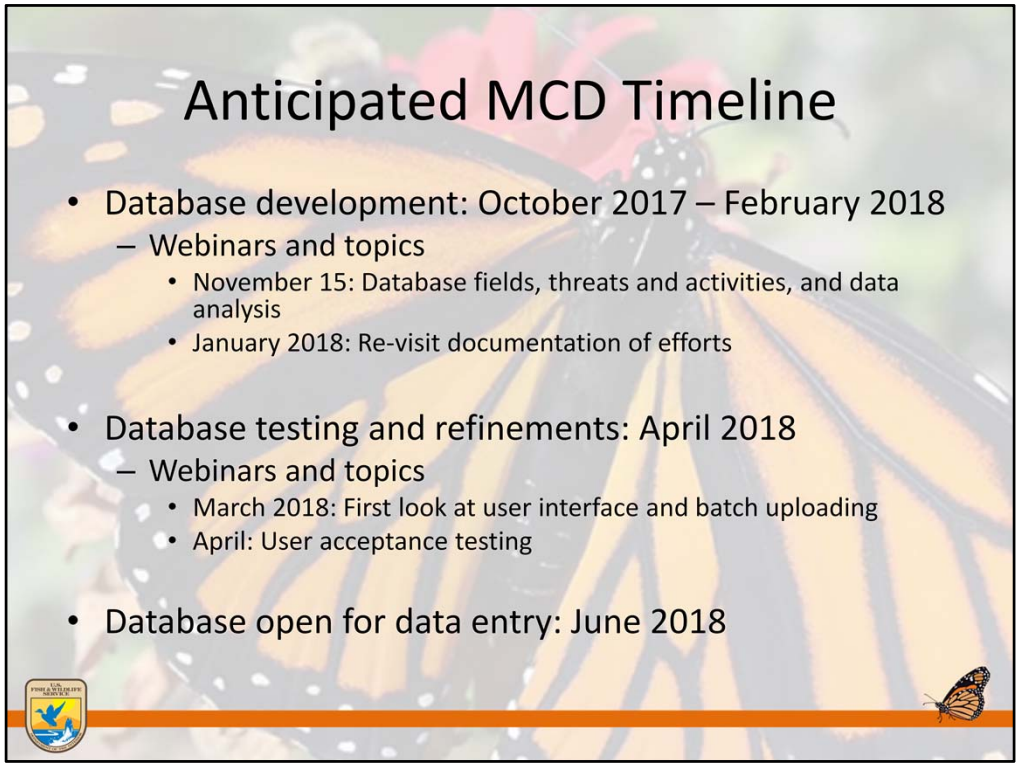
- To calculate the national loss, which is calculated outside the database, we are currently using a USGS land use change model to estimate change in acreage of each land use sector from 2010-2050. https://landcover-modeling.cr.usgs.gov/index.php
- Continuing with our example, say the model predicts a loss of 1,000 acres of shrubland over the next 40 years, we multiply that acreage by the "All Hands On Deck" baseline stems per acre for shrubland to get 3,000 stems of milkweed lost due to loss of shrubland.



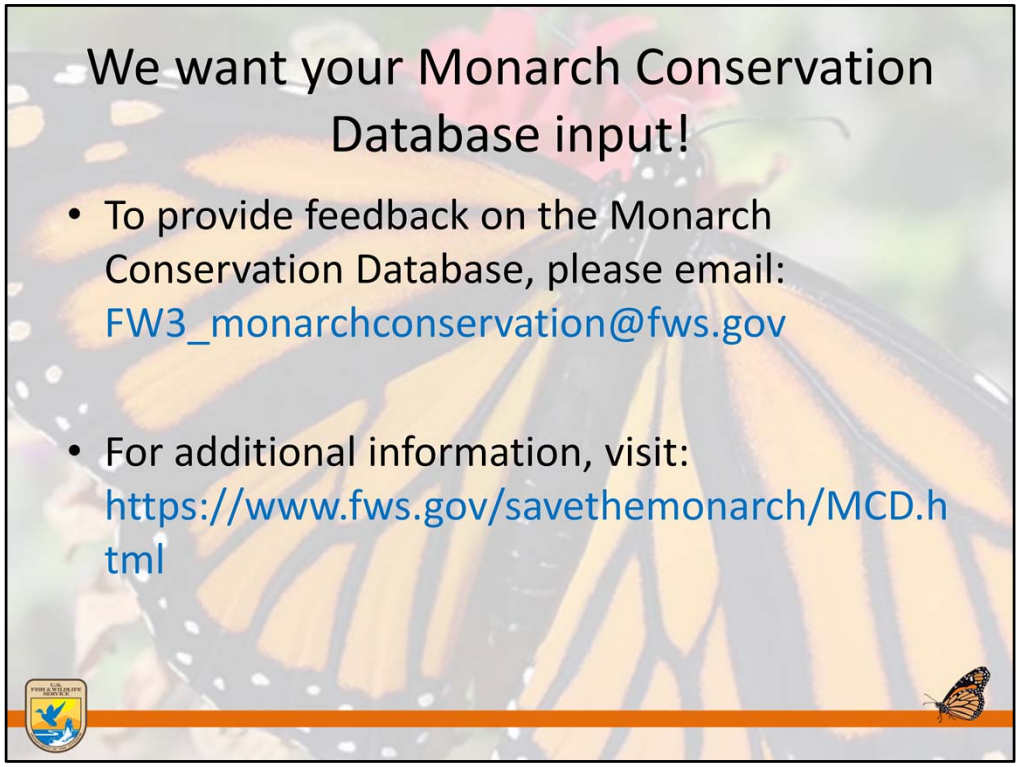
- To calculate gains at a national level, we would add up the net gains of all of the individual efforts in the MCD.
- To calculate the sum of the net gains of all the individual efforts, we would multiply the individual effort acreage by the improved milkweed density post effort.
- The improved milkweed density could either come from the user as an estimate or measured number, or, if user data is not available, we would also go back to the "All Hands On Deck" paper to fill-in the blank.
- Lastly, we subtract the baseline milkweed stem number from the gain just calculated to get the net gain for that individual effort
- Going back to that 10 acre effort example, if that effort resulted in an improved 20 stems per acre, the total gain would be 200 stems (10 acres times 20 stems per acre).
- The net gain after subtracting the original baseline of 30 is 170 stems for that effort



- So, putting it all together, our national baseline was 3 million stems of milkweed in shrubland
- And say the sum of the net gains for all of the individual efforts was one hundred and 3 thousand milkweed stems. With our projected loss of 3,000 milkweed stems lost due to land use change, we get a national net gain of 100,000 milkweed stems.
- As a result of all of the efforts in shrubland, we have an increase in milkweed stems of 3.3%.



- Before we open up our Q and A session, I just wanted to make you all aware of our anticipated database and webinar timeline. We're anticipating our next webinar will be in January of next year where we'll talk a little bit more about how efforts will be documented, especially after I've had a chance to incorporate comments and suggestions. We'll have two more webinars in early spring where we'll get our first look at the database user interface and batch upload process, and we'll have a user acceptance testing period where we will ask for volunteers to test the functionality of the database. Our goal is to have the database open for official data entry by June of 2018.



- Thank you for your interest in the Monarch Conservation Database and participating in this webinar today. For the most up to date information on the MCD, please visit the link shown – in addition to PDF versions of this script and presentation, we will be posting on this website draft versions of the materials presented during this presentation (that's the list of fields, and threats and activities table), as well as MCD updates, and other documents such as FAQs.
- Again, if you have any ideas/thoughts/questions about the database, please do not hesitate to send an email to FW3_monarchconservation@fws.gov
- Thank you!