Applying the Conservation Standards for Connectivity Action Planning

June 29, 2022

Conservation Standards

"There is only one thing more painful than learning from experience and that is not learning from experience.”

- Archibald MacLeish

Adaptive Management

12th Dec 1799 – George Washington is inspecting a plantation in snow

13th Sore throat

14th Dec 2:00 AM Breathing difficulties

- Estate overseer provided mixture molasses, vinegar and butter
- Overseer ordered by Washington to remove 0.75 imperial pint blood

10:00 AM Dr James Craik, personal physician, arrives

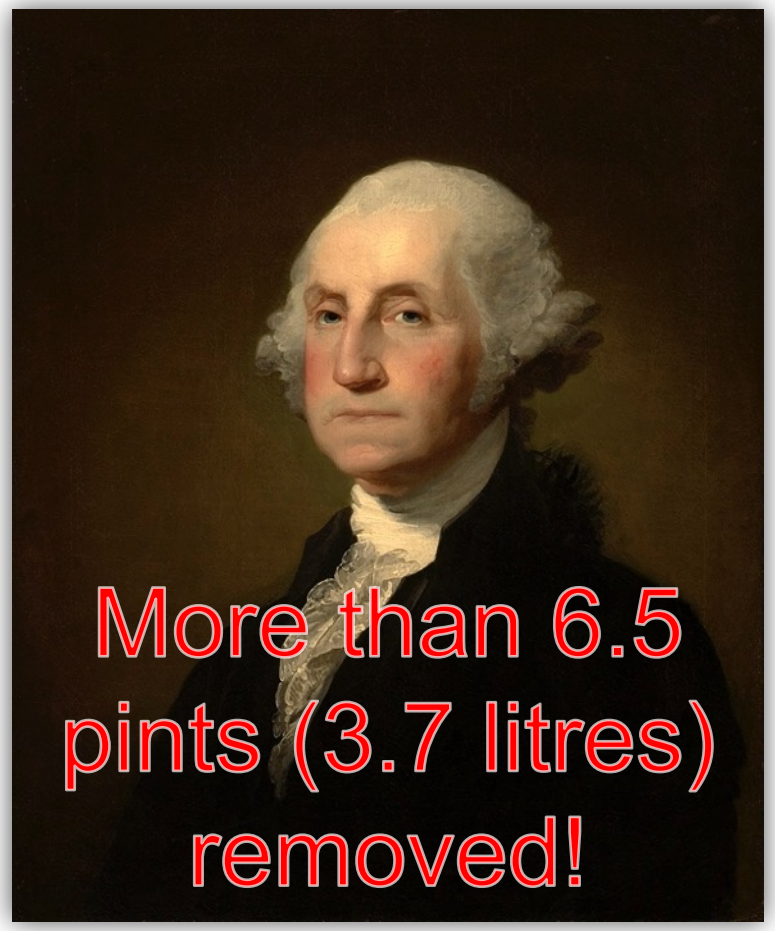
- Preparation dried beetles applied to throat
- 1 pint blood removed
- No improvement so another pint of blood removed
- Vinegar in water gargle – near suffocation
- 2 more pints blood removed

3:00 PM Dr Elisha Dick, prominent physician arrives

- 1.8 pints blood removed

Pulse low

- 10:10pm Died



Adaptive Management


Pierre-Charles-Alexandre Louis (1787–1872).

- Introduced numerical methods to examine the effectiveness of medical interventions
- Demonstrated that blood letting is ineffective
- As a result, the medical community adapted their practices

Adaptive Management

Are we doing the right things?

Are we doing them well?

Are we achieving our desired impact?

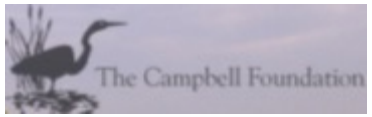
Conservation Standards

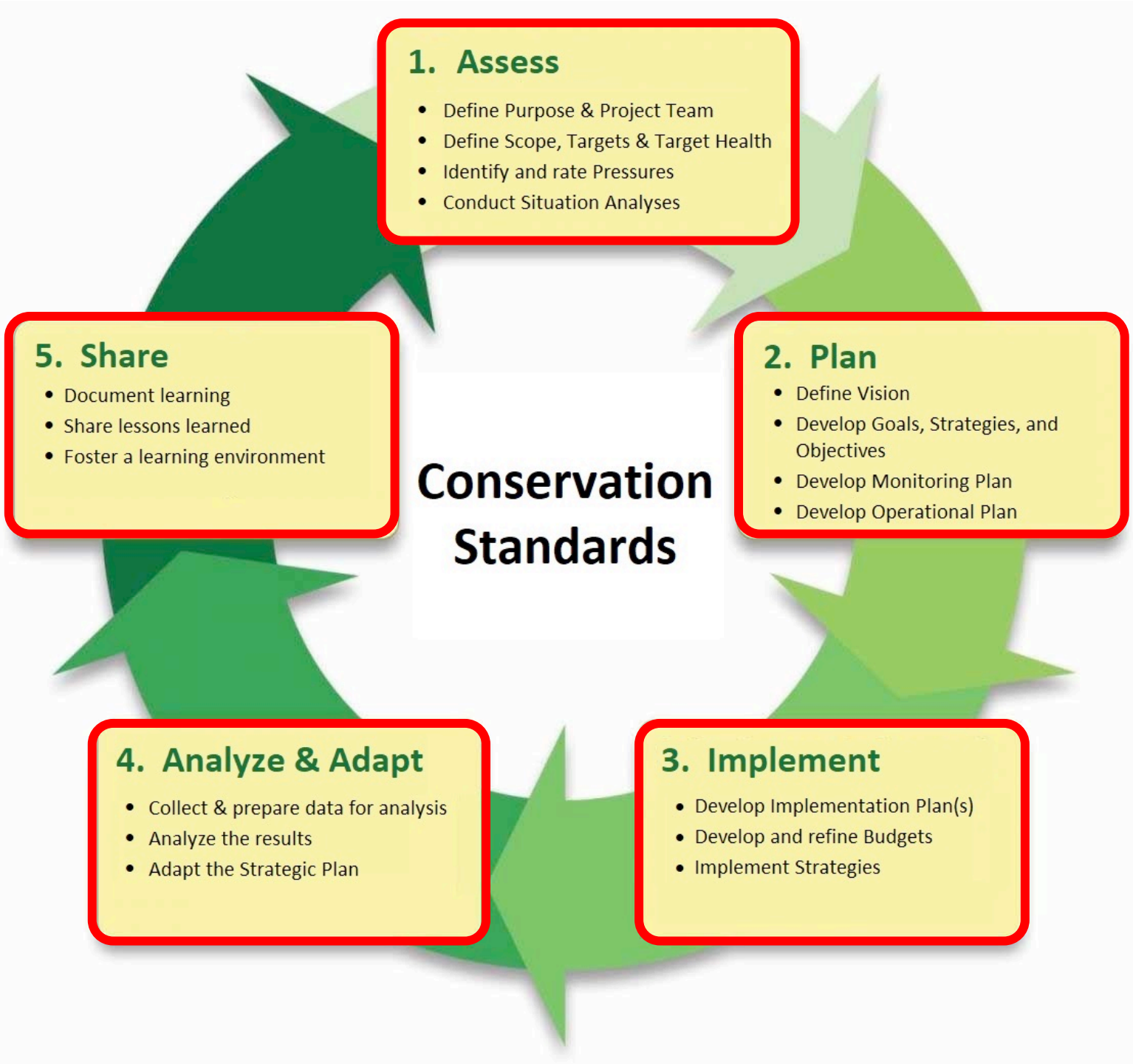
1. Summarize the biodiversity and cultural features that you want to conserve
2. Understand the current condition of those features
3. Identify and rank the pressures that are negatively impacting those features
4. Develop a model to understand what is driving those pressures
5. Identify conservation actions based on the model
6. Define the goals and objectives that you want to achieve
7. Implement the actions and monitor their impacts
8. Adjust the plan as necessary based on the information collected

Conservation Standards

- Can be used at any scale (project, program, organization)
- Consistent terminology
- An abundance of resources available
- Growing network to foster collaboration
- Always improving (we are using version 4.0)
- Recognition as a global standard
- Process is designed to be iterative – nothing is set in stone!

Conservation Standards

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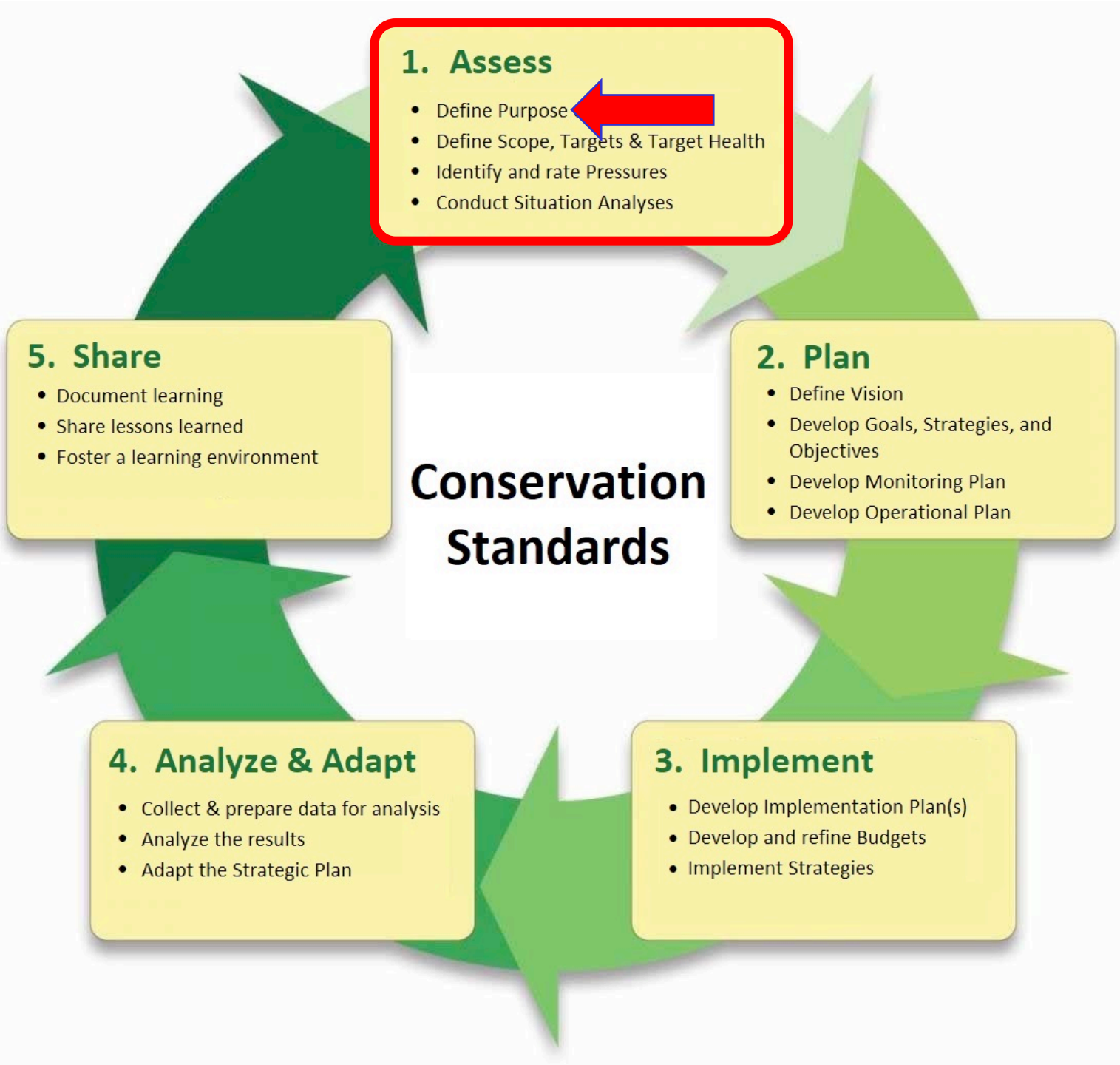
Collect & prepare data for analysis
Analyze the results
Adapt the Strategic Plan
5. Share
Document learning
Share lessons learned
Foster a learning environment
Conservation Standards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Purpose

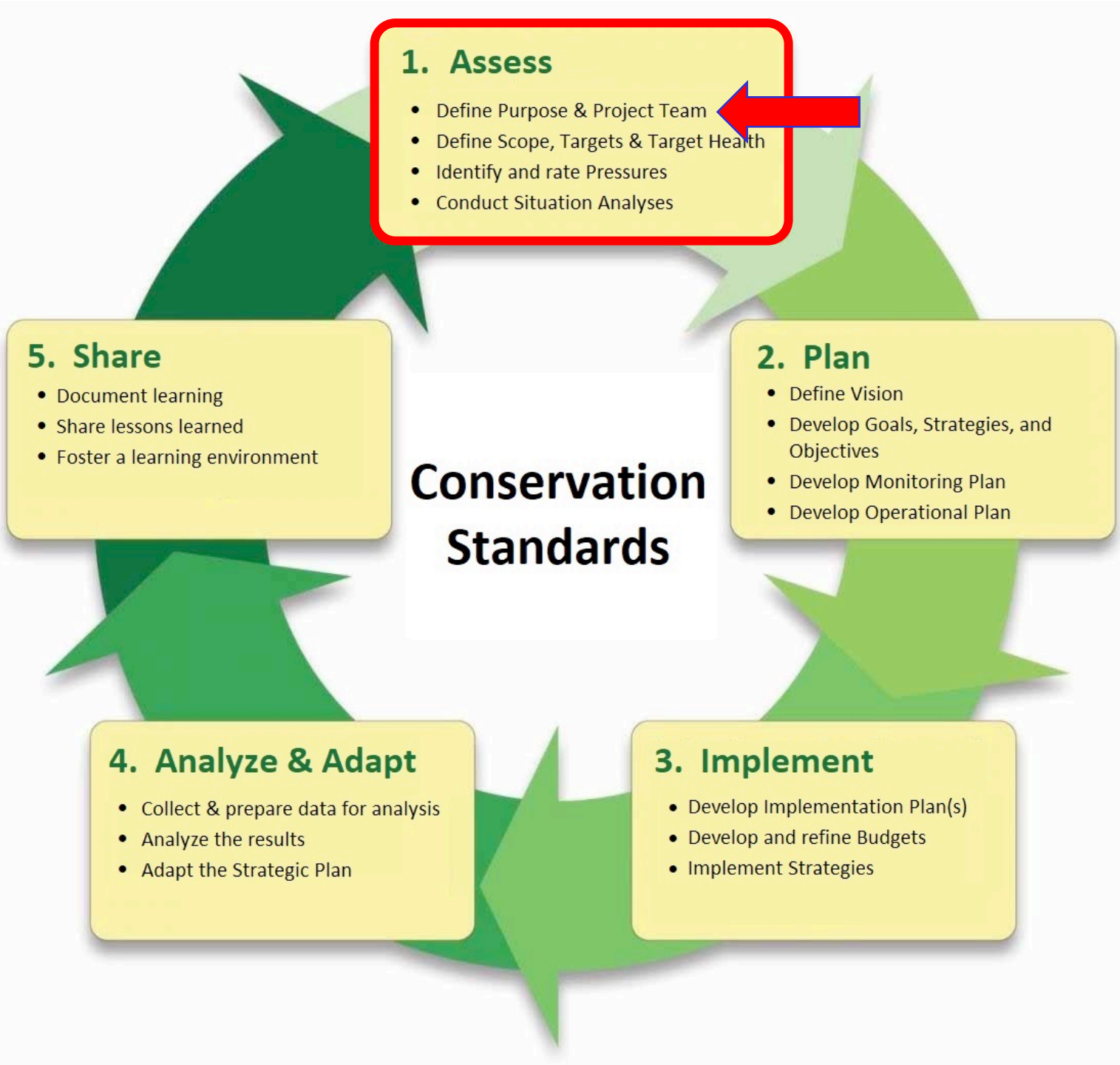
Establish a shared understanding of the PA's purpose:

- Ensure everyone understands the "why" of the plan.
- Set time aside for open discussion to provide clarity on the purpose of creating the action plan in the first place.
- Create a written description of the purpose (i.e., a Purpose Statement) to reference throughout the planning process

Purpose

Example Purpose Statement:

"The purpose of this initiative is to bring together a diversity of views to develop and implement a collaborative action plan to conserve and restore connectivity for wide-ranging mammals within the Chignecto Isthmus region of Canada."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Project Team

Who has knowledge related to the project?

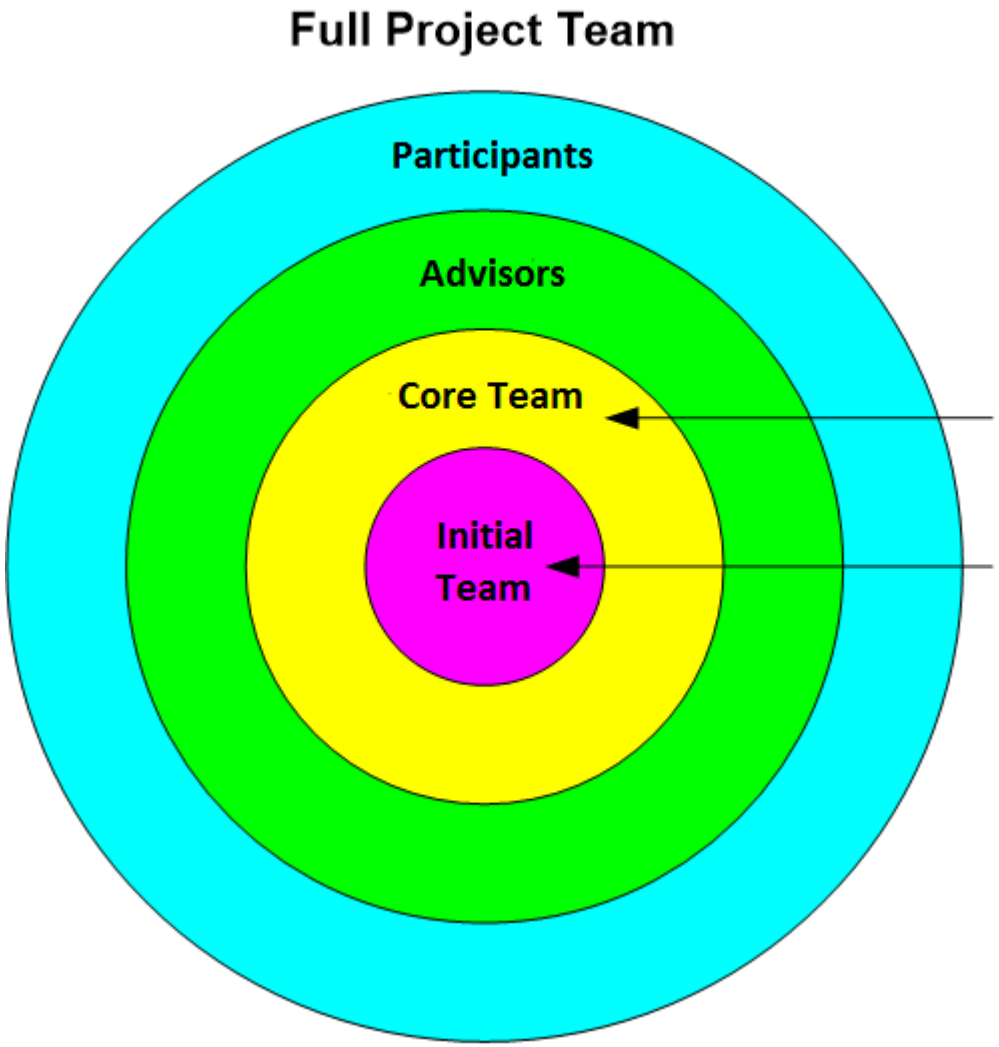
Project Team

Who will be impacted by the project?

Project Team

Who will implement the plan?

Project Team



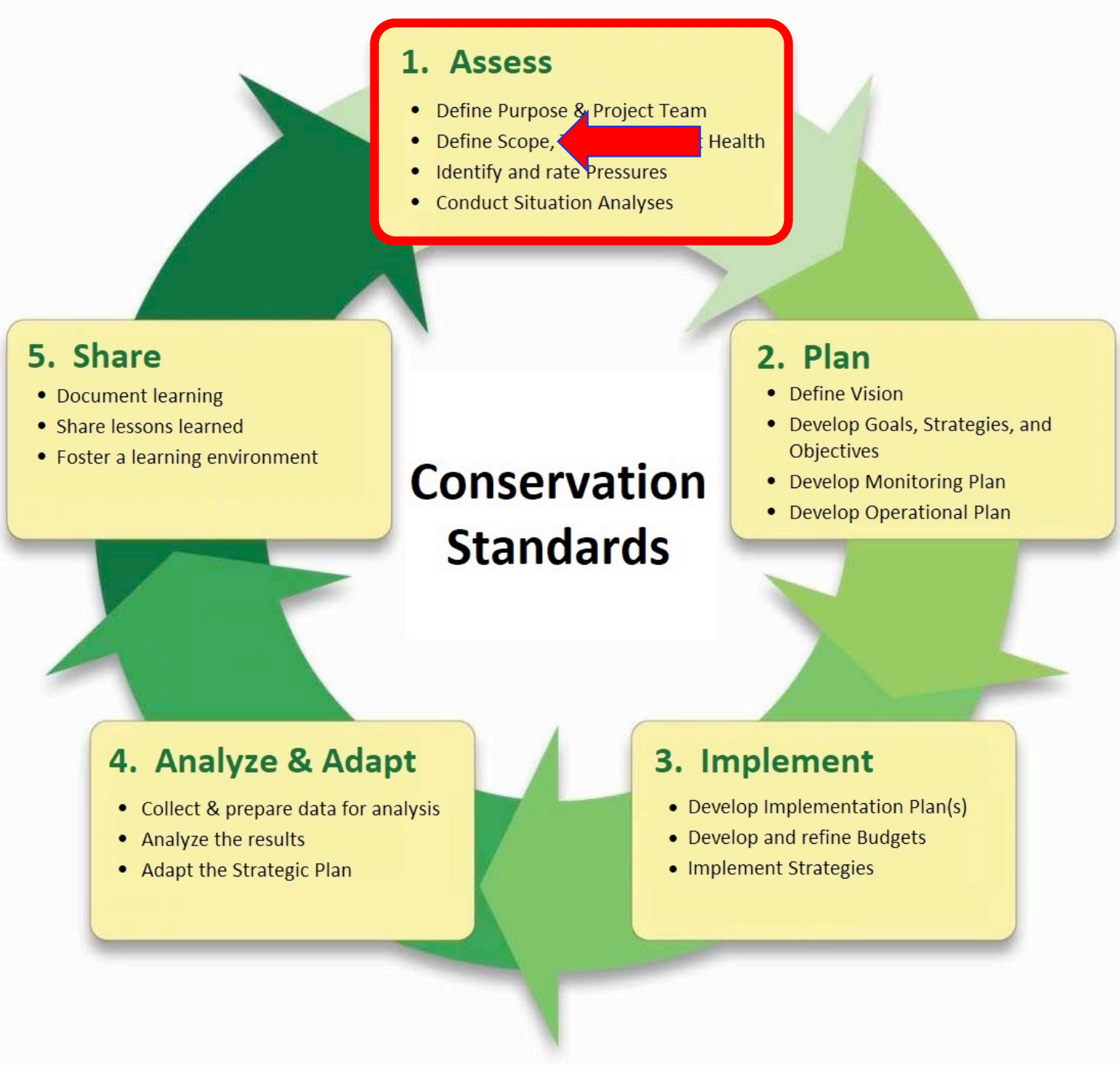
Project Implementers

Project Coordinators / Facilitator

Project Team

Best Practice: Develop a team charter to define roles and support successional planning over the lifespan of the plan

Person	Org.	Skills	Roles	Comments
Christine	WWF	Wetland management; stakeholder liaison, project management	Team leader; project manager & implementer	Has built rapport with key stakeholders; is well-respected
Brett	Local NGO	Wetland biodiversity; community awareness raising	Project officer & implementer	New team member (August 2008)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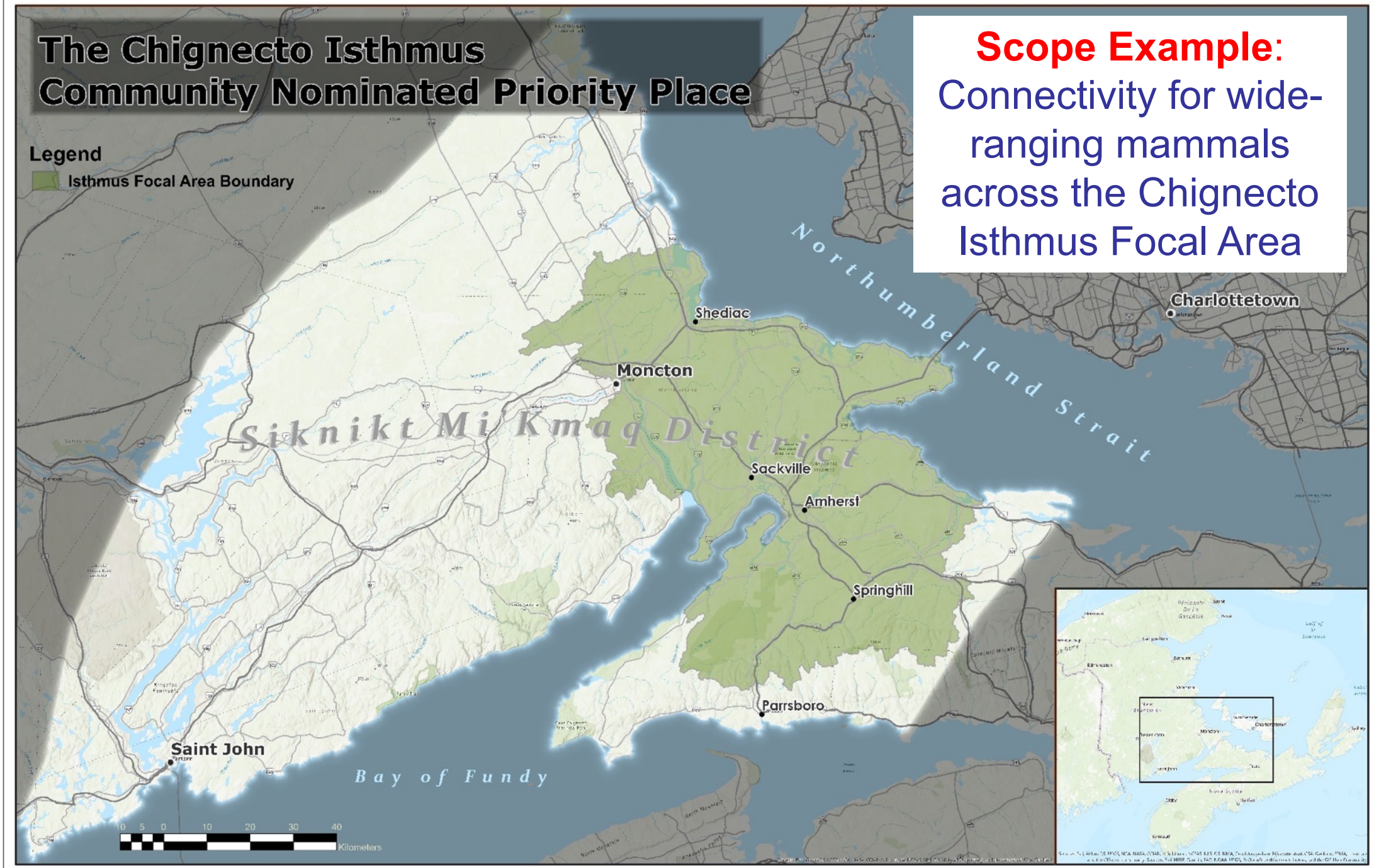
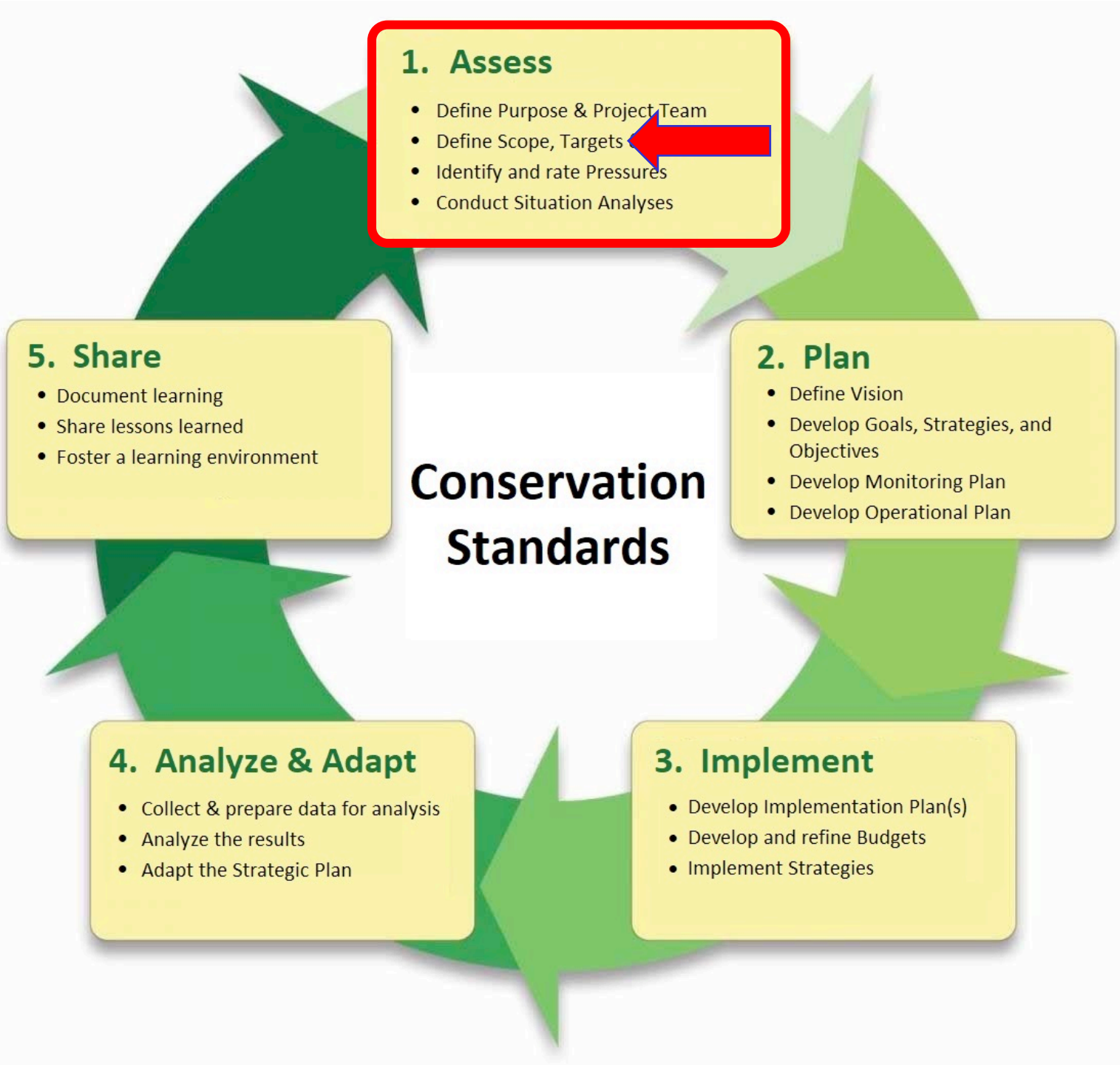
Scope

The area in which the plan will be implemented is the **geographic scope**.

The theme or topic of the plan is the **thematic scope**.


The Chignecto Isthmus
Community Nominated Priority Place
Legend
Isthmus Focal Area Boundary
Scope Example:
Connectivity for wide-ranging mammals across the Chignecto Isthmus Focal Area
Northumberland Strait
Charlottetown
Shediac
Moncton
Siknikt Mi'Kmaq District
Sackville
Amherst
Springhill
Parrsboro
Saint John
Bay of Fundy
0 5 0 10 20 30 40
Kilometers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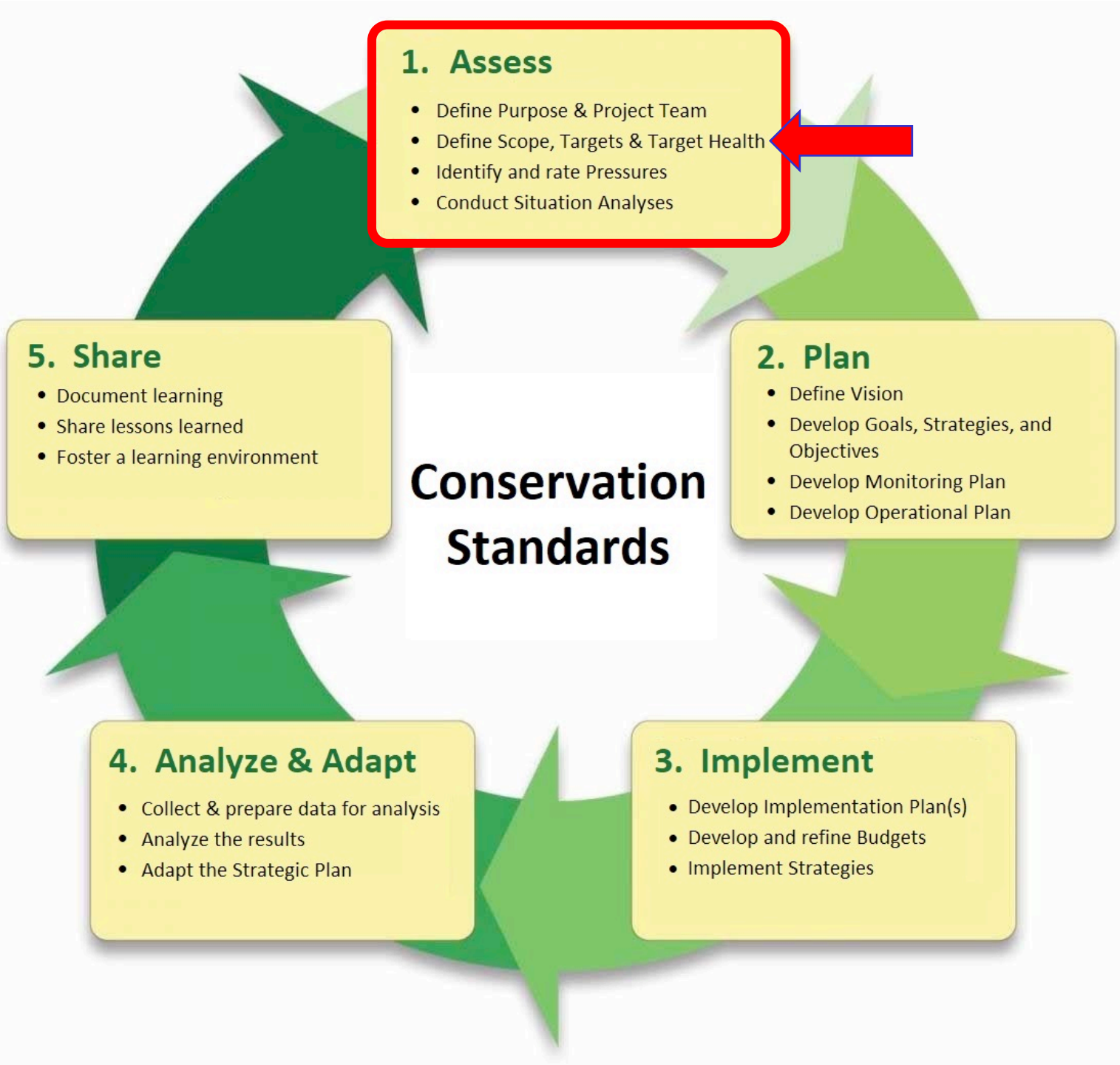
Targets

Targets include the biodiversity features we want to conserve and/or restore connectivity for:

- A specific species or group of species
- A particular ecological community, ecosystem, or biome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Target Health

Target Health represents the ecological integrity or "health" of the Target(s) as it relates to connectivity. Questions we need to answer to assess target health:

What defines "healthy" connectivity for our target(s)?

How do we measure this connectivity "health"?

What is the connectivity health our our target(s) *now*?

Target Health

Ultimately, we want to rate the target health as either **Very Good**, **Good**, **Fair**, or **Poor** by capturing the current state of knowledge on the target:

1. Define “Key Ecological Attributes” (KEAs) for each target (i.e., important characteristics related to connectivity).
2. Identify indicator(s) for each KEA (i.e., what will be measured?)
3. Define the four categories above
4. Define the current status for your target

Example: Wide-ranging Mammals

Target Health

			Indicator Ratings			
Target	**KEA**	**Indicator**	**Poor**	**Fair**	**Good**	**Very Good**
Wide-ranging Mammals	Indicator Species Habitat Accessibility	Distance (km) between core Brown Bear habitat patches	**>1.5km**	**1.0 – 1.5km**	**0.5 – 0.9km**	**<0.5km**
		Current Status:				

Poor:
May result in extinction or extirpation without significant human intervention

Fair:
Outside acceptable range of variation; Requires human intervention

Good:
Within acceptable range of variation; Some intervention may be required for maintenance

Very Good:
Ecologically desirable status; Requires little intervention for maintenance

Target Health

			Indicator Ratings			
Target	**KEA**	**Indicator**	**Poor**	**Fair**	**Good**	**Very Good**
Wide-ranging Mammals	Geographic Extent of Forest Habitat	Total area (ha) of forest	**<1,000 ha**	**1,000 – 2,000 ha**	**2,001 – 3,000 ha**	**>3,000 ha**
		Current Status:				**2,165 ha**

Poor:
May result in extinction or extirpation without significant human intervention

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Target Health

			Indicator Ratings			
Target	**KEA**	**Indicator**	**Poor**	**Fair**	**Good**	**Very Good**
Wide-ranging Mammals	Degree of Structural Connectivity	Average Local Connectedness Index	**0-25**	**25-50**	**51-75**	**75-100**
		Current Status:		**42.6**		

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Planning Language Issues

1. The IUCN Connectivity Guideline definition of ‘Objectives’ is fundamentally different from the Conservation Standards definition of ‘Objectives’.
2. Objectives in the IUCN guidelines combine aspects of Purpose, Scope, Targets, and Target Health into a single statement.
3. While useful for communication purposes, to develop an effective action plan, these components need to be parsed out and analyzed individually to design meaningful connectivity indicators that can track change over time.

Box 2
Ecological corridor objectives — some examples

1. **Movement of individuals:** To allow for the movement of dispersing tigers (*Panthera tigris*) between India's Dudhwa and Jim Corbett national parks (Seidensticker et al., 2010); to allow wildebeest (*Connochaetes taurinus*) to move between the Serengeti Plains in the United Republic of Tanzania and the Masai Mara Reserve in Kenya in a clockwise manner (Serneels & Lambin, 2001); to aid in the recovery of biota after habitat destruction, e.g. due to mining in deep-sea hydrothermal vent ecosystems (Van Dover, 2014).
2. **Genetic exchange:** To allow for the movement of giant pandas (*Ailuropoda melanoleuca*) in China between population segments that have been separated by a highway and associated development (Zhang et al., 2007); to allow for the diadromous migrations of European eel (*Anguilla anguilla*) through rivers and the North Atlantic Ocean (Kettle & Haines, 2006).
3. **Migration:** To facilitate the annual June passage of wood turtles (*Glyptemys insculpta*) from habitat in Canada's La Maurice National Park to breeding beaches outside of the park (Bowen & Gillingham, 2004); to conserve the pathways of fish, such as the dorado catfish (*Brachyplatystoma rousseauxii*) to breeding sites in the Amazon or green sturgeon (*Acipenser medirostris*) in the Pacific Northwest of the USA (Benson et al., 2007); to conserve one or more of the stopover sites that maintain the migration of spoon-billed sandpipers (*Calidris pygmaea*) and other migratory sandpipers that breed in Russia's Siberia and Kamchatka and migrate along the Pacific coast of Asia, wintering from eastern India to southern China (Menxiu et al., 2012).
4. **Multi-generational movement:** To provide habitat for monarch butterflies migrating over several generations along a central flyway in the states of Minnesota, Iowa, Missouri, Kansas, Oklahoma, and Texas, USA (the 'Monarch Highway', www.monarchhighway.org).
5. **Maintenance/restoration processes:** To restore hydrologic function, such as sediment transport or nutrient cycling, by removing dams from small streams in Wisconsin, USA (Doyle et al,. 2000).
6. **Climate change adaptation:** To facilitate range shifts of species to adjacent mountain ranges through restoring riparian corridors in agricultural landscapes in California, USA (Keeley et al., 2018).
7. **Enhancement of recovery:** To serve as a source of conifer seeds for restoring native trees in logged areas of the mixed forest zone of European Russia (Degteva et al., 2015).
8. **Prevention of undesired flows:** To reduce erosion risk by stopping the increasing velocity of surface water flows downslope in rugged terrain of cultivated steppe landscapes in southern Russia, Ukraine, Moldova, Kazakhstan (Ladonina et al., 2001).

Target Health

			Indicator Ratings			
Target	**KEA**	**Indicator**	**Poor**	**Fair**	**Good**	**Very Good**
Tigers	Movement between sub-populations	Number of Tigers that move between the two NPs per year	**<5**	**5-10**	**11-15**	**>15**
		Current Status:			**11**	

Poor:
May result in extinction or extirpation without significant human intervention

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Target Health

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Giant Pandas	Genetic Exchange	Genetic variation between population segments (F_{ST} Statistic)	**>0.25**	**0.15 – 0.25**	**0.05 – 0.14**	**<0.05**
		Current Status:			**0.6**	

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Target	**KEA**	**Indicator**	**Poor**	**Fair**	**Good**	**Very Good**
Wood Turtles	Annual Migration Success	Proportion of Wood Turtles that successfully reach a breeding beach	**<30%**	**30-60%**	**61-90%**	**>90%**
		Current Status:	**28%**			

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May result in extinction or extirpation without significant human intervention

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Target	**KEA**	**Indicator**	**Poor**	**Fair**	**Good**	**Very Good**
Monarch Butterflies	Geographic Extent of Habitat	Total area of suitable habitat (sq km)	**<150**	**150 - 500**	**501 - 1,000**	**>1,000**
		Current Status:			**645**	

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Target Health

			Indicator Ratings			
Target	**KEA**	**Indicator**	**Poor**	**Fair**	**Good**	**Very Good**
Small Streams	Degree of Free-flowing Status	Linear proportion of small streams unobstructed by dams	**<50%**	**50 - 70%**	**71– 90%**	**>90%**
		Current Status:		**54%**		

Poor:
May result in extinction or extirpation without significant human intervention

Fair:
Outside acceptable range of variation; Requires human intervention

Good:
Within acceptable range of variation; Some intervention may be required for maintenance

Very Good:
Ecologically desirable status; Requires little intervention for maintenance

Box 2

Ecological corridor objectives — some examples

1. **Movement of individuals:** To allow for the movement of dispersing tigers (*Panthera tigris*) between India's Dudhwa and Jim Corbett national parks (Seidensticker et al., 2010); to allow wildebeest (*Connochaetes taurinus*) to move between the Serengeti Plains in the United Republic of Tanzania and the Masai Mara Reserve in Kenya in a clockwise manner (Serneels & Lambin, 2001); to aid in the recovery of biota after habitat destruction, e.g. due to mining in deep-sea hydrothermal vent ecosystems (Van Dover, 2014).
2. **Genetic exchange:** To allow for the movement of giant pandas (*Ailuropoda melanoleuca*) in China between population segments that have been separated by a highway and associated development (Zhang et al., 2007); to allow for the diadromous migrations of European eel (*Anguilla anguilla*) through rivers and the North Atlantic Ocean (Kettle & Haines, 2006).
3. **Migration:** To facilitate the annual June passage of wood turtles (*Glyptemys insculpta*) from habitat in Canada's La Maurice National Park to breeding beaches outside of the park (Bowen & Gillingham, 2004); to conserve the pathways of fish, such as the dorado catfish (*Brachyplatystoma rousseauxii*) to breeding sites in the Amazon or green sturgeon (*Acipenser medirostris*) in the Pacific Northwest of the USA (Benson et al., 2007); to conserve one or more of the stopover sites that maintain the migration of spoon-billed sandpipers (*Calidris pygmaea*) and other migratory sandpipers that breed in Russia's Siberia and Kamchatka and migrate along the Pacific coast of Asia, wintering from eastern India to southern China (Menxiu et al., 2012).
4. **Multi-generational movement:** To provide habitat for monarch butterflies migrating over several generations along a central flyway in the states of Minnesota, Iowa, Missouri, Kansas, Oklahoma, and Texas, USA (the 'Monarch Highway', www.monarchhighway.org).
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Target Health

			Indicator Ratings			
Target	**KEA**	**Indicator**	**Poor**	**Fair**	**Good**	**Very Good**
Facultative Riparian Wildlife	Riparian Corridor Condition	Proportion of land within 30m of streams and rivers comprised of forest or wetland	**<50%**	**50 - 70%**	**71– 90%**	**>90%**
		Current Status:			**74%**	

Poor:
May result in extinction or extirpation without significant human intervention

Fair:
Outside acceptable range of variation; Requires human intervention

Good:
Within acceptable range of variation; Some intervention may be required for maintenance

Very Good:
Ecologically desirable status; Requires little intervention for maintenance

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Target Health

			Indicator Ratings			
Target	**KEA**	**Indicator**	**Poor**	**Fair**	**Good**	**Very Good**
Conifers	Number of mature conifers	Total number of cone-bearing conifers	**<400**	**400 - 900**	**901 – 1,500**	**>1,500**
		Current Status:				**1,545**

Poor:
May result in extinction or extirpation without significant human intervention

Fair:
Outside acceptable range of variation; Requires human intervention

Good:
Within acceptable range of variation; Some intervention may be required for maintenance

Very Good:
Ecologically desirable status; Requires little intervention for maintenance

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Target Health

			Indicator Ratings			
Target	**KEA**	**Indicator**	**Poor**	**Fair**	**Good**	**Very Good**
Steppe Landscape X	Geographic extent of native grasslands	Total area of native grasslands on slopes >20%	**<400**	**400 - 900**	**901 – 1,500**	**>1,500**
		Current Status:				**1,545**

Poor:
May result in extinction or extirpation without significant human intervention

Fair:
Outside acceptable range of variation; Requires human intervention

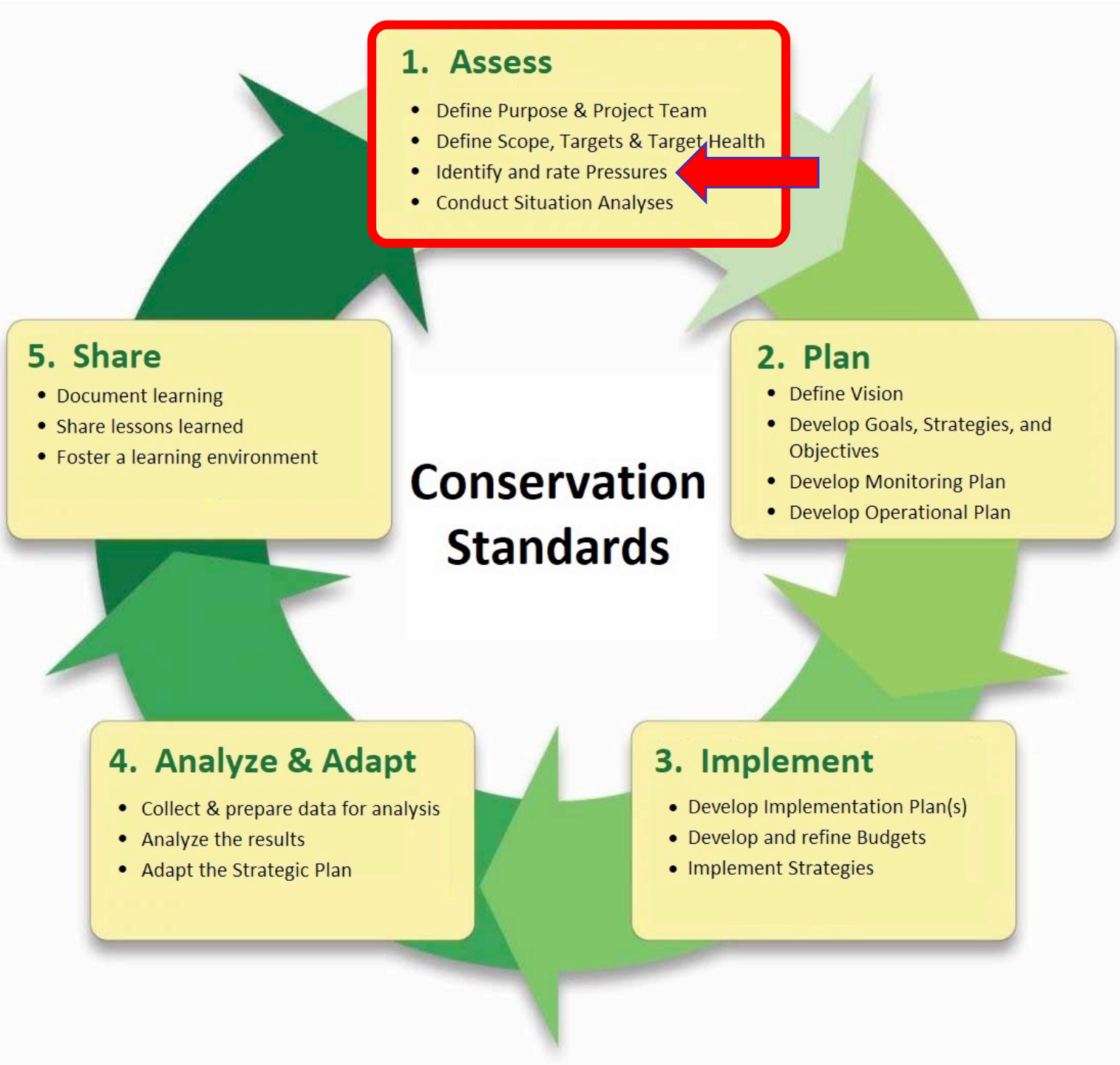
Good:
Within acceptable range of variation; Some intervention may be required for maintenance

Very Good:
Ecologically desirable status; Requires little intervention for maintenance

Target Health

When Considering Target Health:

- Choose **KEY** ecological attributes; as few KEAs as possible that will meaningfully capture the connectivity health of each Target.
- Select indicators that are efficient and affordable to measure, preferably from existing monitoring efforts / data sources.
- Be prepared to accept uncertainty and embrace ***imperfect action***. Don't let *perfect* be the enemy of *good*!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Define Purpose & Project Team
Define Scope, Targets & Target Health
Identify and rate Pressures
Conduct Situation Analyses
2. Plan
Define Vision
Develop Goals, Strategies, and Objectives
Develop Monitoring Plan
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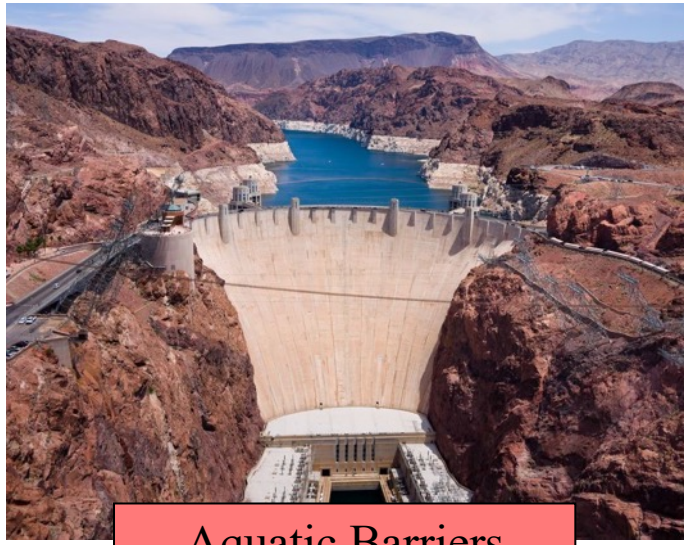
3. Implement
Develop Implementation Plan(s)
Develop and refine Budgets
Implement Strategies
4. Analyze & Adapt
Collect & prepare data for analysis
Analyze the results
Adapt the Strategic Plan
5. Share
Document learning
Share lessons learned
Foster a learning environment
Conservation Standards

Pressures

Pressures: Human-induced actions that are destroying and/or degrading connectivity for our target(s):

Unsustainable Logging



Aquatic Barriers

Road Fragmentation

Pressures

Direct pressure: Human-induced actions or events that directly degrade one or more conservation targets.

Example: Unsustainable Logging

Indirect pressure/contributing factor: an economic, cultural, societal, or institutional factor which allows or encourages direct pressures to occur

Examples: need for income, lack of knowledge, lack of enforcement

Pressures

Typical CS Pressures Assessment:

1. List the direct pressures for each target that it impacts.
2. Determine the **Extent**, **Severity**, and **Irreversibility** of each pressure on the targets that the pressure impacts.
3. Rate pressures for each target as **Low**, **Medium**, **High**, or **Very High**.
4. Combine for an overall pressure rating

Pressures Across Targets		Tigers	Giant Pandas	Wood Turtles	Monarch Butterflies	Small Streams	Conifers
1	Unsustainable Logging	X	X	X		X	
2	Road fragmentation		X	X			X
3	Agricultural expansion	X	X				X
4	Aquatic Barriers	X		X		X	X
5	…	X					X
6	…				X	X	
7	…	X					X
8	…					X	
9	…					X	
10	…					X	
11	…	X				X	

Pressures

Extent: Within the project scope, the proportion of the target that is affected by the pressure within ten years given the continuation of current circumstances and trends.

Very High: The pressure is likely to be pervasive in its extent, affecting the target across all or most (71-100%) of its occurrence/population.

High: The pressure is likely to be widespread in its extent, affecting the target across much (31-70%) of its occurrence/population.

Medium: The pressure is likely to be restricted in its extent, affecting the target across some (11-30%) of its occurrence/population.

Low: The pressure is likely to be very narrow in its extent, affecting the target across a small proportion (1-10%) of its occurrence/population.

Pressures

Severity: Within the project scope, the level of damage to the target from the pressure that can reasonably be expected given the continuation of current circumstances and trends.

Very High: The pressure is likely to destroy or eliminate the target or reduce its population by 71-100% within ten years or three generations.

High: The pressure is likely to seriously degrade/reduce the target or reduce its population by 31-70% within ten years or three generations.

Medium: The pressure is likely to moderately degrade/reduce the target or reduce its population by 11-30% within ten years or three generations.

Low: The pressure is likely to only slightly degrade/reduce the target or reduce its population by 1-10% within ten years or three generations.

Pressures

Irreversibility: Within the project scope, the degree to which the effects of a pressure can be reversed, and the target affected by the pressure restored, if the pressure no longer existed.

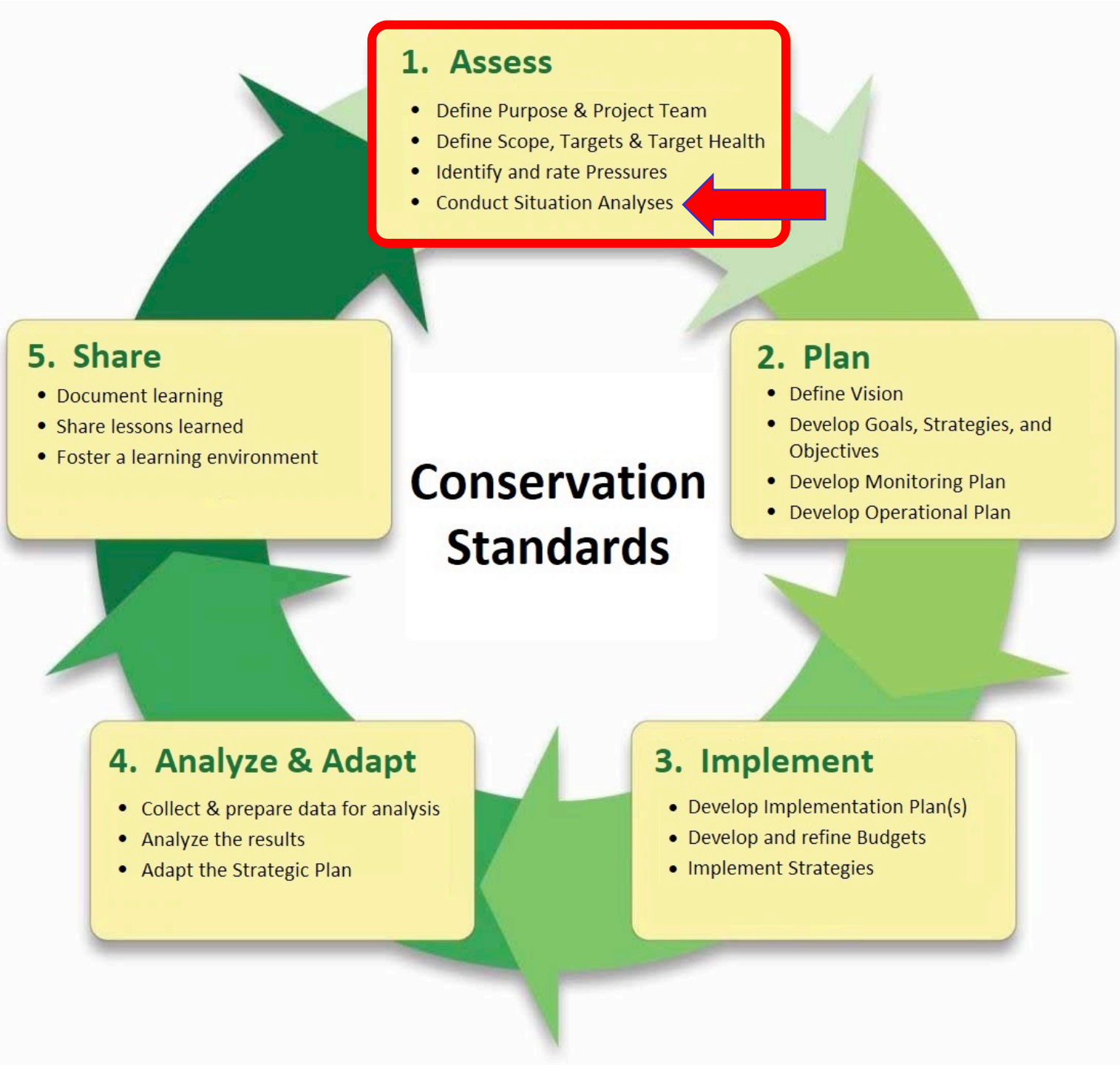
Very High: The effects of the pressure cannot be reversed, and it is unlikely the target can be restored and/or it would take more than 100 years to achieve this.

High: The effects of the pressure can technically be reversed, and the target restored, but it is not practically feasible and/or it would take 21-100 years to achieve this.

Medium: The effects of the pressure can be reversed, and the target restored with a reasonable commitment of resources and/or within 6-20 years.

Low: The effects of the pressure are easily reversible, and the target can be easily restored at a relatively low cost and/or within 0-5 years.

Pressures Across Targets		Tigers	Giant Pandas	Wood Turtles	Monarch Butterflies	Small Streams	Conifers	Overall Pressure Rank
1	Unsustainable Logging	Medium	Very High	High		Medium		Very High
2	Road fragmentation		Very High	Low			High	High
3	Agricultural expansion	Medium	Very High				Medium	High
4	Aquatic Barriers	Medium		High		Medium	High	High
5	…	High					High	High
6	…				Medium	High		Medium
7	…	High					Medium	Medium
8	…					High		Medium
9	…					High		Medium
10	…					Medium		Medium
11	…	Medium				Medium		Medium
Pressure Status for Targets and Project:		High	Very High	High	Medium	High	High	Very High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Collect & prepare data for analysis
Analyze the results
Adapt the Strategic Plan
5. Share
Document learning
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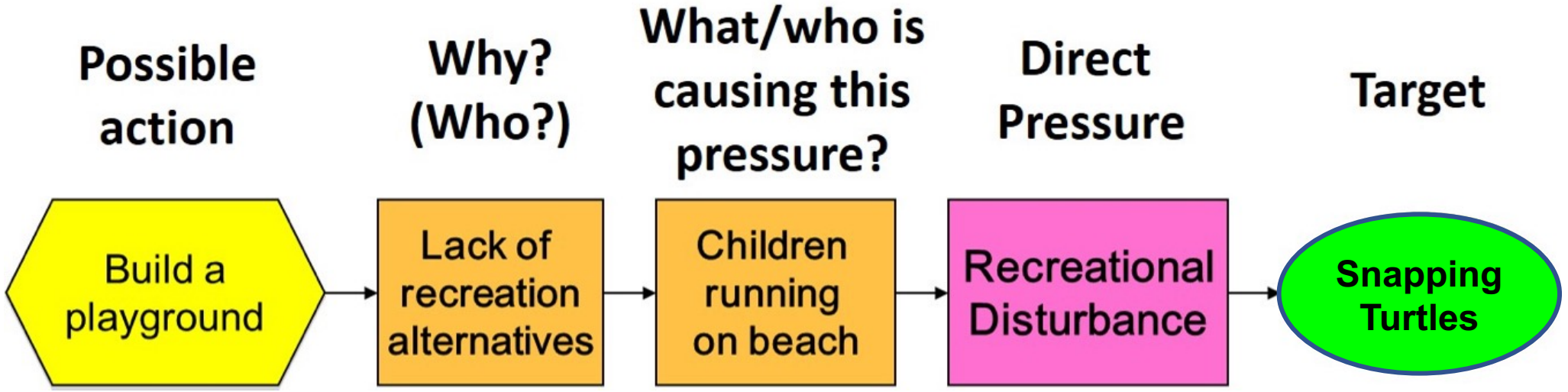
Situation Analysis

Situation Analysis: a process for creating a shared understanding of the project context.

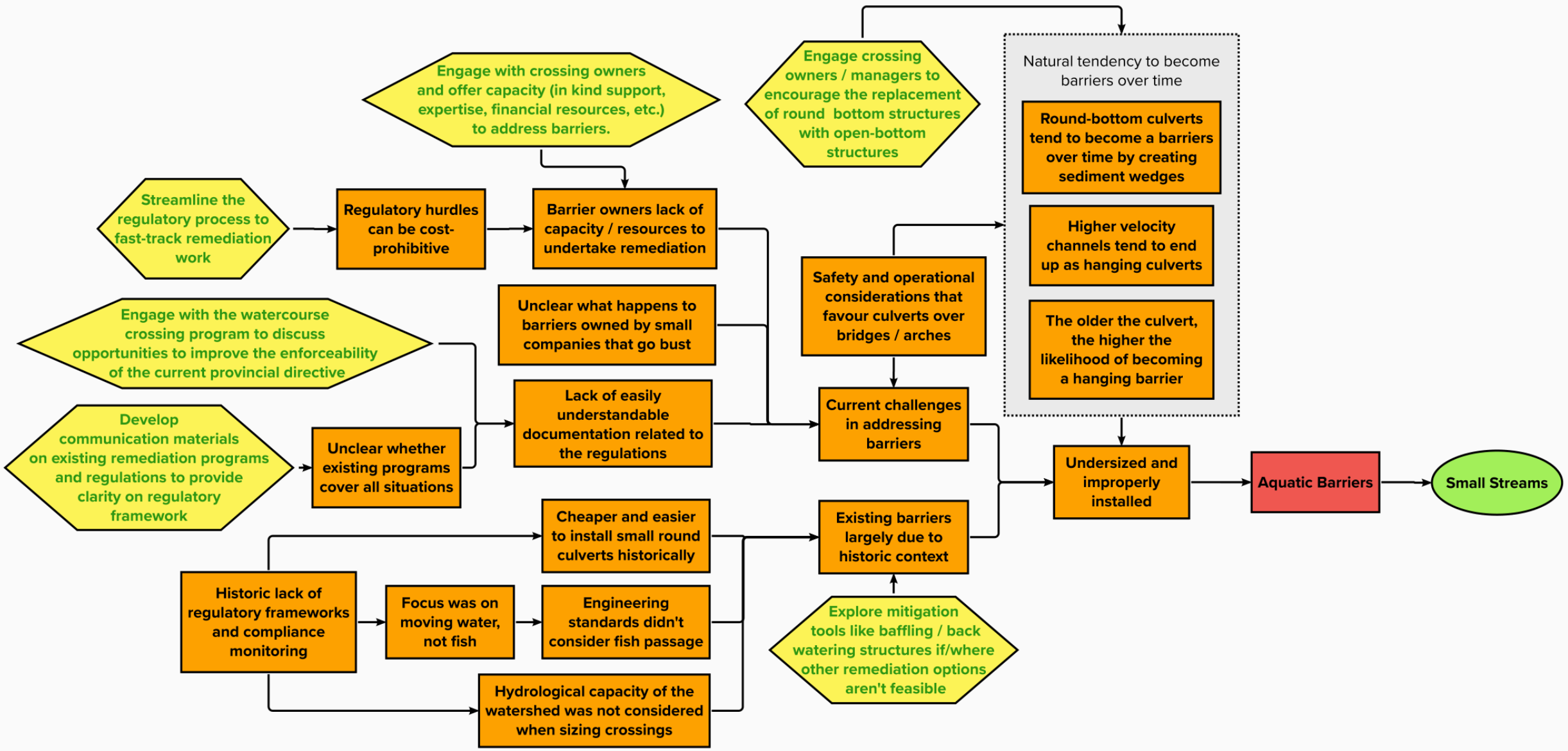
What are the social, economic, cultural, political, ecological and institutional systems that affect connectivity for our targets?



Conducting a Situation Analysis:

1. List the pressures that you will analyze using the pressure assessment results as decision support.
2. Start with a single pressure and begin identifying and linking the underlying drivers of the pressure in a diagram.
3. Continue identifying drivers until you reach a natural endpoint in the discussion.
4. Begin identifying potential actions to address the pressure and/or its underlying drivers.

Example Situation Analysis - Aquatic Barrier impacts on Small Streams



Situation Analysis

When Considering Situation Analyses:

- The end goal of a situation analysis is to locate opportunities for meaningful **action**.
- Content is more important than format!
- A wide range of knowledge and expertise on the team is likely to provide better understanding of the overall context.
- Remember – this is a brainstorming exercise! Base the connections on evidence wherever possible, but don't succumb to "analysis paralysis".

Situation Analysis

A good Situation Analysis is critical for designing effective strategies.

By extension, the quality of a connectivity action plan is only as good as the team's shared understanding of the current situation.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Target Health
Analyses
2. Plan
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Develop Operational Plan
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Collect & prepare data for analysis
Analyze the results
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Document learning
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