Making a Fynbos Stepping-Stone Garden

A Framework to Guide Your Fynbos Gardening Process

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FYNBOS CORRIDOR COLLABORATION

A community-focused strategy to increase socio-ecological connectivity in Cape Town

Creating a Fynbos Stepping-stone Garden - Overview

online tools available
www.fynboscorridors.org

1. Select a site

Consider site size, how close it is to the next potential site, biogeography, ownership and management.

2. Assess and imagine

Social assessment:

Option 1: Social needs analysis
Option 2: Social benefits wheel

Ecological assessment:

1. Find vegetation type
2. Find reference site
3. Describe current vegetation
4. Describe physical conditions
5. Restorative continuum

Vision and Mission

With local officials and users, create a combined social and ecological mission and vision

3. Choose plants

1. Understand site Fynbos history and ideals
2. Select from ideal plant species list for social and ecological needs
3. Understand growing conditions
4. Do baseline assessment and organise plants by succession phase
5. Add non-Fynbos species to list

4. Design your garden

Option 1: Copy existing designs
Option 2: Learn design skills

- for vegetation recovery
- for existing and desired social uses
- to manage disturbance
- to create habitat for target animal species
- to create connection for target animal species between stepping-stones

5. Make a work plan

1. Succession planning
2. Eco-sourcing plants
3. Site and soil preparation
4. Planting
5. Garden care

6. Monitor & adapt

1. plant health and diversity
2. Animal species richness and abundance

Are you attracting pollinators and seed dispersers to your site?

Social and psychological assessment

Is the site valued and cared for as an important part of the social life of the area?

1. Select a site

site selection tool available
www.fynboscorridors.org

Consider site size, how close it is to the next potential site, ownership and management. Use our online site selection tool to start, along with the decision-tree that follows.

Select a site - A Decision Tree

START

Biogeography: Consider size, shape, layout, edge and barriers of each site. Choose the best sites.

online tool available
www.fynboscorridors.org

Size of all areas suitable for rehabilitation adds up to >1ha?

Yes

No

Proximity to the next stepping-stone

<500m

>500m

Possible Stepping-stone sites? Either:

- Schools
- Libraries
- Cemeteries
- Pools
- Private yards

No

Possible corridor connections? Either:

- Rivers
- Roads
- Railways

Possible to increase collective area to >1ha within 500m radius?

Yes

No

Select an alternative area for rehabilitation

Yes

No

Check ownership: can long term written permission, and a strong local allyship be secured with the owner? *

No

Yes

Yes

Continue with Step 2

Is the site suitable for rehabilitation? Can work be done without the expertise of a qualified restoration ecologist? *

No

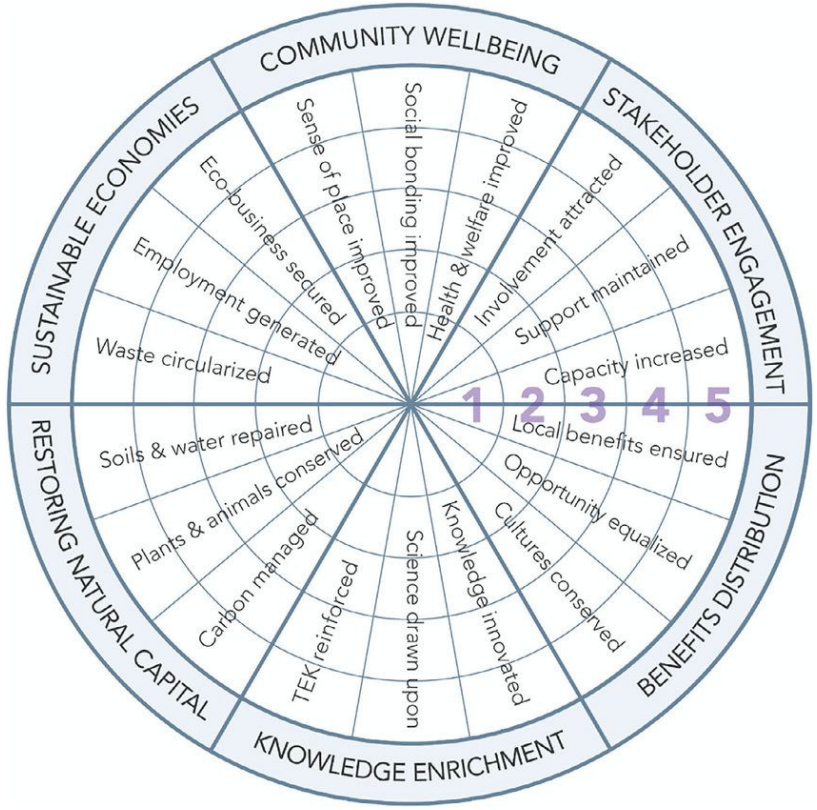
** First consult your biodiversity or area officer in the Recreation and Parks Department to answer these questions when working in a public open space.*

2. Assess and Imagine

Assess the social and ecological needs of your site or sites, and imagine how these needs can be integrated into a vision for your site.

Social needs: what are they at and around your site?

Option 1: Simply assess the current social value of the site, access and uses. Aim to understand why it is valued by different users. Do a local social needs analysis and ask around to understand current social challenges.
Option 2: Fill out the Social Benefits Wheel below, set your goals, and track your progress over the years.



Social Benefits Wheel, from Society of Ecological Restoration, International Standards and Principles of Ecological Restoration

Why are the social and ecological wheels important?

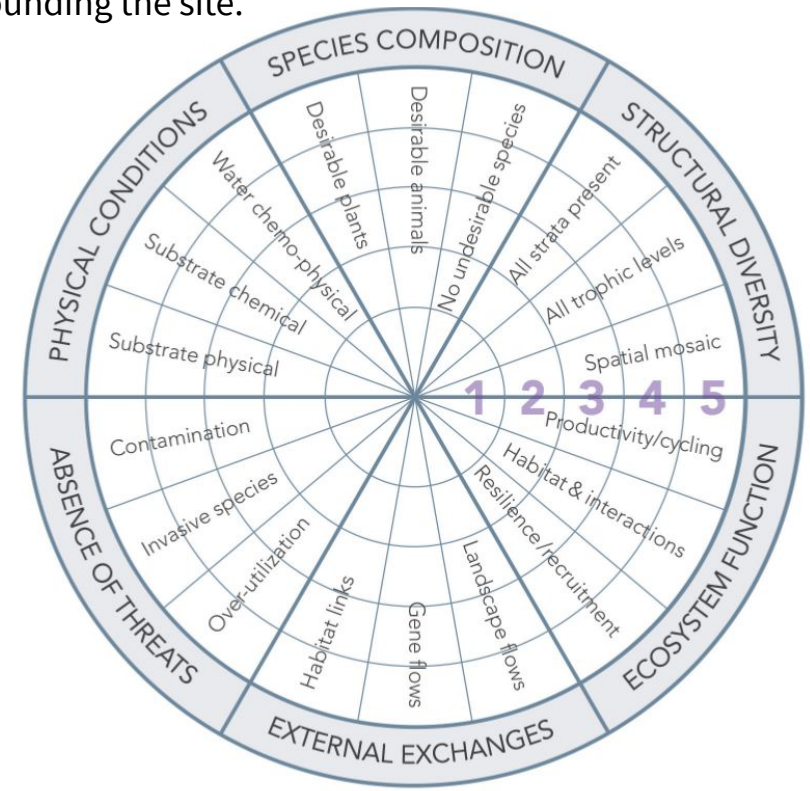
- By filling this out, you will be thinking in a wider social way about your garden, and you might discover social needs and other important elements you did not think about before.
- You will be forced to define your own priorities, which is good for focused efforts.
- By setting (and sharing) priorities, you/we can link your garden to people with similar priorities, allowing you to learn from and together with like-minded people.

How to fill out this wheel:

- This wheel is supported by an international community of practitioners. It was developed by the Society of Ecological Restoration (SER).
- In order to understand what each segment means and how to score it, please use the documentation provided by SER:
    - The full restoration standards (scientific paper) where the wheel is explained
    - Free online course about ecological restoration
    - Page with relevant resources

Ecological needs of your site

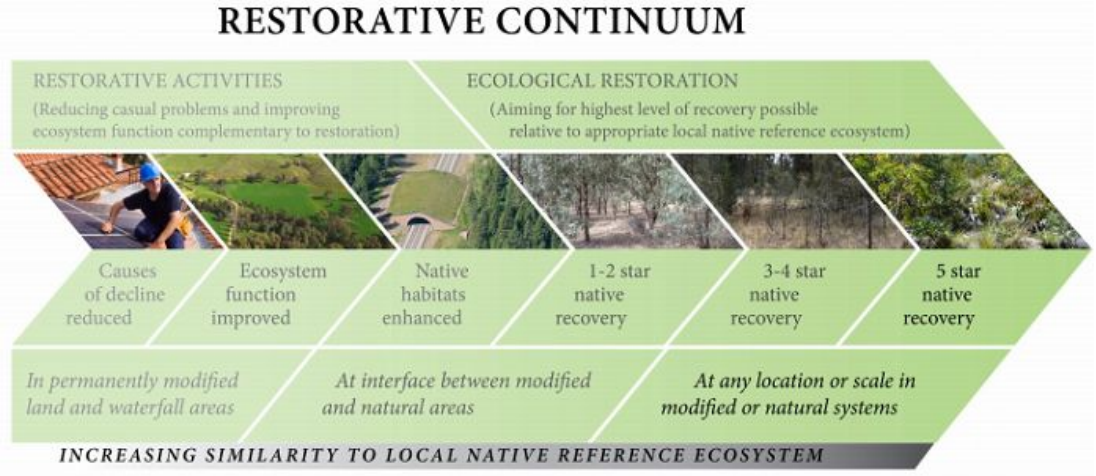
1. Find out the historical vegetation type and reference ecosystem for it.
2. Find the closest natural remnant or green space.
3. Describe current vegetation cover and structure, and create a species list of existing plants.
4. Do a quick wildlife survey.
5. Describe current conditions: soil type and contamination, water levels and flows, dumping, erosion, impact of activities in and surrounding the site.



Ecological Recovery Wheel, from Society of Ecological Restoration, [International Standards and Principles of Ecological Restoration]

Recovery on the restorative continuum

6. Find where your site fits on the restorative continuum and set a realistic level of recovery.



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Vision and mission

With local officials, users and neighbours, define a problem statement and create a combined social and ecological mission and vision. Use the outcomes from the social and ecological assessment as a starting point.

Workshop an integrated social and ecological vision and mission for your site

Useful workshopping tools and references:

- How to facilitate a team vision workshop

This is your first opportunity to start building alliances within your site community. Consider the following tools to facilitate understanding the problems and working with social divides in your area:

- Exploring inequality and power game
- Gender, power and consent toolkit
- Building bridges among communities of colour
- Working with power to change the status quo

It is important to integrate the social and ecological challenges and understand how they are interlinked with one another. What are their root causes? Use intersectionality as a way to consider the social and ecological issues at once.

Our problem, vision and mission

- Our problem is (one sentence):

- Our vision is (one sentence):

- Our mission is (one sentence):

Goal	Objective	Action	Time-frame	Measured by
Example: Establish networks for key Fynbos pollinators.	Select indigenous and nectar-rich plant species that support bird and insect pollinators.	Planting Fynbos species like leonotis leonurus, salvia aurea, pelargonium capitatum and carpobrotus edulis that supports pollinating insects and sunbirds.	Ongoing - Pioneer phase (year 1) to the specialist phase (year 3). Planting in June to July each year.	Bird & insect monitoring after introducing plants to the garden. Their presence or absence will indicate if the goal has been achieved.
Goal 1				
Goal 2				
Goal 3				
Goal 4				

3. Choose plants

plant selection tool available
www.fynboscorridors.org

Find and understand the historical vegetation type of your site. Based on the historical vegetation type and your social and ecological needs assessment, create your custom site species list. Fynbos expert advice is key at this step.

Create a Plant Species List

1. Understand Fynbos history and ideals

a. Look up the historical vegetation type of the site and remaining reference site, e.g.:

Cape Flats Sand Fynbos | Peninsula Shale Renosterveld | Cape Flats Dune Strandveld

b. Locate reference site for vegetation type, e.g.:

Kenilworth Conservation Area | Signal Hill | Blaauwberg (North) / Edith Stephen's (South)

c. Locate plant species list for your vegetation type

d. Locate ideal soil characteristics for vegetation type, e.g.:

Sandy acidic | Clay | Sandy alkaline

2. Select from ideal plant species list

a. Select plant species for social value:

- Safety
- Edible
- Medicinal
- Shade
- Wind block
- Beauty (p.63)

b. Decide which animal species to provide habitat for

c. Select plant species for ecological function:

- Functional diversity
- Species richness
- Vegetation structure
- Flowering phenology

3. Understand growing conditions

a. Assess soil texture and pH against ideal conditions
b. Observe light availability at the site
c. Observe the annual water cycle of the site
d. Observe wind exposure at the site

e. Decide whether to amend soil, water and light to ideal, or adjust plant species list to match current conditions

4. Do baseline assessment and organise plants by succession phase

Disturbed? | Invaded? | Native species present?

Phase 1: pioneer plants → Phase 2: structure and functional diversity plants → Phase 3: climax and special species

5. Add non-Fynbos species to list

a. Choose selectively for garden function not fulfilled by ideal Fynbos species list.

b. Check they are non-invasive and do not hybridise with plants on ideal species list.

4. Design garden

course and examples

Designing your garden

The important part of the design step for Fynbos Stepping-stone garden is to integrate the design elements that fulfil social and ecological together. Design is a skill that takes training so you have two options:

Option 1: copy elements from existing designs that respond to the same social and ecological needs as you.

Option 2: learn design skills. Free online basic landscape design courses are at Udemy. Other online course will likely come up on other sites like coursera, EdX and Khan Academy.

Design Checklist

Ensure you have a design that includes design elements for:

for existing and desired social uses dump to garden and art beautifies the space for socialising, while weeds converted to veg garden provides food

for vegetation recovery by planting pioneers of Fynbos on the steep bank, erosion is halted and pollination and medicinal plants can be added

to create connection for target animal species between stepping-stones gardening plant choice is synchronised with neighbouring suburb of Obs and gardens created in between

to manage disturbance tyre and stone border and signage

to create habitat for target animal species plant species selection provides nectar for sunbird guild and groundcover for leopard toads

Chatham Neighborhood Garden 2019, Salt River

Chatham Neighbourhood Garden 2020, Salt River

Creating habitats for animal species

	Locally indigenous animal*	Approx. dispersal distance	Goal	Animal Needs and Method of building habitat
1	The sunbird guild - generalist nectivorous bird pollinators e.g. The Southern Double Collared Sunbird	~1km	Provide locally indigenous plant feed to encourage bird feeding to move from alien bottle brush and hibiscus to indigenous plants. This helps to repair the plant-pollinator mutualism relationship where the plant is pollinated while the bird is fed, which is undone when local birds feed on alien plants.	Needs: This bird species eats nectar, and especially when breeding it also requires protein from insects as well as nesting material to become resident in the area Method: a) increase volume of nectar-rich locally indigenous pioneers ('Wilde Dagga' *Leonotis leonurus*, 'Wild Sage' *Salvia aurea* and others) b) increase the volume of insect-attracting locally indigenous plant species c) increase the duration of time during the year that locally indigenous nectar-rich plants are in flower by planting a diversity of species that flower throughout the year.
2	Generalist insect pollinators (e.g. Cape honeybee,)	<300m	Increase abundance / presence of indigenous insect species	Needs: A variety of plants from various Fynbos plant families, that flower throughout the year, but especially in spring when most insects breed. Method: a) plant pioneer plants, some of which support generalist insect pollinators, b) increase the diversity of plant species in each stepping-stone that support the Cape honey-bee and monkey beetles, so as to provide for the diversity of indigenous insects that occur in Renosterveld.
3	Leopard Toad	~1km	Enhance and protect existing local habitat and movement corridors	Needs: Safe annual breeding migration route from gardens to local wetlands in about August Method: a) Toad friendly fences with small gaps of ~15cm at ground level. b) Toad friendly storm-water drainage = toad size steps c) increased unpaved yard and driveway space d) form and/or support toad patrols such as those in Ottery and Kommetjie to provide safe passage across roads for the few weeks in August that the toads move from garden hibernation areas to local wetland areas. Making this a festive and fun social activity each year would make the practice more sustainable and integrated. For example, asking local restaurants to participate by providing a gluhwein or hot meal after each toad patrol.
4	Cape Dwarf Chameleon	near continuous fence / shrub	Provide safe feeding and dwelling habitat for the dwindling species	Needs: Small and medium sized shrubs like 'Wilde dagga' Leonotis leonurus, which provides shelter from bird predators and food in the form of insects that are attracted to the flowers. Individuals are very territorial over their bush and should not be moved around without careful consideration, and they are very sensitive to being handled by humans which can give them severe stress. a) Plant small and medium chameleon climbable shrubs and fences throughout Observatory. chameleon plant species =
5	Specialist insects dispersers	0 to 300m	Restore the plant-disperser relationship between indigenous plants and ant species	Needs: Plant clusters of minimum 6 Protea plants throughout Obs. a) Partner with Iimbovane at Stellenbosch University. b) Might need to be introduced into area
6	The sunbird guild - specialist protea and erica pollinators/feeders	~ 1 km	Restore potential migration route	Needs: Require specific erica and protea climax plant species in enough quantity to motivate and seasonal in migration into the area, or enough flowering plants throughout the year to establish resident birds. Requires help overcoming highways, mainroads, and railway between Observatory and Table Mountain. Plant clusters of minimum 6 Protea … through out Obs, with at least one less than dispersal distance of bird away from Table Mountain. Steps: a) Look up Malachite sunbird, Orange-breasted sunbird and Cape Sugar Bird needs. b) Partner with Cape Bird Club or similar to consider design
7	Rain Frog	(?)	Provide safe mating and hibernation habitat in gardens near the Liesbeek and gardens with or near rain gardens	Needs: These species are found near water-bodies like the Liesbeek River and hibernate in soil under groundcovers.

5. Make a work plan

Fynbos works very much according to the seasons of the year. To make your life easier, work with the seasons and the habits of the plants for that season. To help with this, create a succession and planting plan. Look online at our website to get help with a tool here that generates species lists for people, from starting with pioneers to increasing the diversity, structure and functioning of the garden.

Annual work plan: plan your year				
Month	**Jan to Feb**	**Mar to May**	**Jun to Jul**	**Aug to Dec**
Stepping-stone stage	Planning & design	Garden preparation & place-making	Planting	Ongoing care & monitoring
Actions for this time of year	Site visit, baseline assessment, garden vision and design, community activation and mobilisation.	Physical layout design, ground preparation, landscaping, cues to care, eco-sourcing and propagating plants.	Year 1: pioneers and groundcovers Year 2: planting for structure and diversity Year 3: planting climax species	Garden maintenance, evaluation and applying adaptive management. Monitoring the social and ecological goals. Share skills and knowledge gained.
Your planned activities for this year				

Step 1. Succession planning

Year 1: pioneers and groundcovers:

Year 2: planting for structure and diversity:

Year 3: planting climax and special species:

Step 2. Eco-sourcing plants

Source from a Fynbos restoration nursery, noting the original area in Cape Town each species was sourced from:

- Cape Flats Sand Fynbos -- Fynbos Life
- Cape Flats Dune Strandveld -- Fynbos Life
- Peninsula Sandstone Fynbos -- Good Hope Gardens Nursery

*Please note that you need a permit to pick, grow and sell plants. You also need landowner permission. See Cape Nature.

Step 3. Site and soil prep

a. Remove invasives

b. Install Landscape and monitoring features

- Pathways
- Borders and fences
- Landscaping
- Features
- Educational signage
- Monitoring

Step 4. Planting

1. Position the plants where they will be planted in the garden according to your plant design.
2. Dig a hole 2 x depth & 2 x width of the planting bag and fill the hole with water.
3. At disturbed sites with sandy soil where little topsoil remains it is advisable to add some compost. Acid compost can be mixed in with the soil that was removed from the hole. Use the mixture to fill up the space around the plant once the plant has been placed in the hole.
4. Fynbos plants are sensitive to hand temperature and gripping pressure so work as quickly and gently as possible. When removing plants from pots or bags, take extra care not to disturb the highly sensitive rooting system and never loosen the soil from the roots. Start by gently loosening the plant from the original pot, tip the pot upside-down, holding the plant between your fingers, and gently remove the pot. Then place the plant in a pre-dug hole in the soil.
5. Cover the entire root system with the remaining mix of soil and compost and gently level the soil around the base of the plant to form a slight basin to catch and hold water.
6. Add a layer of mulch (chipped wood, rough compost or pine needles) at least 3 to 5cm thick to help protect the soil and retain moisture.
7. Give the plants another round of watering, at the base of the plant stems, immediately after planting and adding mulch.

Step 5. Garden care

Pruning	Some species grow faster than others. Prune back after flowering to promote healthy new growth. Pinching the tips of plants or bushes encourages bushy and full growth. Remove some groundcovers and pioneers when they are no longer required. These can be transplanted into the next stepping-stone or used to expand another section in the current garden.
Watering	Stepping-stones will require watering during the first two summers until the plants are well established and adapted to the local microclimate. Deep but infrequent watering is best (15 to 20mm) to imitate natural rainfall. This will encourage plants to grow deeper in search of moisture and set them up to be resilient during dry spells. Adjust watering with the seasons and as the garden becomes established. Over watering may result in rapid growth and more maintenance. It also ultimately shortens the lifespan of some plants.
Mulching	Annual mulching helps maintain healthy soil and moisture during hot dry spells. Mulching is required for as long as there remains bare patches of soil. Groundcovers are essentially living mulches and should be used as much as possible. Note that some grow very fast and may overgrow slower growing species. It is advised to add a 3 to 5 cm layer of mulch of chipped wood, rough compost or pine needles.
Feeding	Occasionally add organic fertilizer and foliar feed like fish or seaweed extract. Do not use chemical fertilizers high in phosphate or animal manure compost.
Weed & pest control	Avoid using inorganic products in the garden as poison never works in isolation. Rather choose organic remedies of which many can be made at home from inexpensive and safe to use ingredients and increase plant diversity that allows nature to establish a balance. Invasives should be eradicated and reported if necessary.

6. MONITOR

To understand how well your gardening is developing over the years, use the following monitoring tools.

Monitoring your Fynbos Stepping-stone: Plants

Aim: *to develop a soil-water-plant ecosystem that provides similarly functional habitat to the original historic habitat for specific insect and bird pollinators.*

Functional stepping stones

Functional diversity

- Plant species for insect pollinators:
- Plant species for bird pollinators:
- Plant species for seed dispersers:

Species richness

- Number of plant species in the garden?
- Number of plant genera in the garden?
- Number of plant families in the garden?

Vegetation Structure

- Number of different growth forms (shrubs, forbs, geophytes, graminoids) present

Flowering phenology

- Spring flowering species for bird and insect pollinators?
- Summer flowering species for bird and insect pollinators?
- Autumn flowering species for bird and insect pollinators?
- Winter flowering species for bird and insect pollinators?

Note that plant species selection should reference both the historical vegetation type for recovering the basic function of the ecosystem and target species specific insect and bird pollinators.

Indicators:

Insect pollinated plants; bird pollinated plants; seed plants (in this order):
<3: <3 <1. refer to plant selection guideline
>10; >10; >3: good
>20; >20> 5: Ideal

Focus on functional diversity: monitor whether species, genus and family richness is increasing every year. No specific guideline on number of species.

Number of growth forms:
1-2: refer to plant selection guideline
3: good
4: Ideal

Seasons with flowers:
1-2: refer to plant selection guideline
3: good
4: Ideal

Monitoring your Fynbos Stepping-stone: Animals

Aim: *an animal community that sustains the plant community and supports multiple trophic levels.*

Functional stepping stones:

Insect diversity

- Spring sampling: number of bees
- Spring sampling: number of beetles
- Spring sampling: number of dragonflies.

Indicators: # orders; # of individual insect sightings

Bird diversity

Monthly bird counts to determine the number of species and abundance over a year.

Indicators: # species; # families; Abundance

Amphibian and reptile diversity

Number of species recorded on iNat for your site over the last year.

Indicators: # species; # families

Crustacean diversity

Number of species recorded on iNat for your site over the last year.

Indicators: # species; # families

Mammal diversity

Number of species recorded on iNat for your site over the last year.

- squirrels
- moles and mole rats
- mice and rats

Indicators: # species; # families

No specific score as a benchmark as this will differ between sites depending on many factors. The focus here is to use the previous year (or the first year) as a benchmark.

Monitoring your Fynbos Stepping-stone - Biophilia

Aim: *to increase nature appreciation and environmental stewardship.*

Psychosocial Impact of Participation in Corridor Building

Contact with Nature

- Time spent on interactions with the natural world.

Biophilia

- Love of nature.
- Connection with nature.
- Respect for nature.

Biophobia

- Hatred of nature.
- Disconnection from nature.
- Fear of nature.

Note: SAfter participating in corridor building, it is expected that scores for contact with nature and biophilia will increase and scores for biophobia will decrease.

Indicators:

Psychosocial Questionnaire