

SUSTAINABLE TRAIL DEVELOPMENT AND EDUCATION IN PATAGONIA: PERITO MORENO NATIONAL PARK



2019 INTERNATIONAL TRAIL SYMPOSIUM, SYRACUSE, NY

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LEARNING OBJECTIVES FOR THIS PRESENTATION

- To present an overview of the project scope and goals
- Examine parameters considered to achieve those goals
- Describe methodology for teaching sustainable trail design concepts
- Highlight difficulties and accomplishments



WHERE IS PERITO MORENO NP?



“The park is open daily 9am–9pm between October and April, but can be cut off by snow, sometimes for weeks on end; the weather changes moods like a spoilt child.”

–THE ROUGH GUIDE TO ARGENTINA, PAGE 494



“Extreme isolation means that, despite being one of Argentina’s first national parks to be created, the **PARQUE NACIONAL PERITO MORENO** is also one of its least visited. Though replete with glorious mountains and beautiful lakes, this is not a ‘sightseeing’ park...”

—THE ROUGH GUIDE TO ARGENTINA, PAGE 493





TIMELINE OF DEVELOPMENT PROCESS

- Early 1990's: Doug and Kristine Tompkins visit Perito Moreno National Park (PNMP) and buy a 37,500 acre parcel abutting the park to the north
- 2010-12 The Tompkins Foundation donates the parcel to the Park
- 2013: The Butler Foundation (BCF) identifies PMNP as a priority for conservation based infrastructure development
- 2016: BCF hires a local mountain guiding company to build a remote hut and a different local team to layout and construct a long distance hiking trail at the north end of the park
- February 2017: BCF is impressed with the hut building team and asks them to source crew members for the trail construction



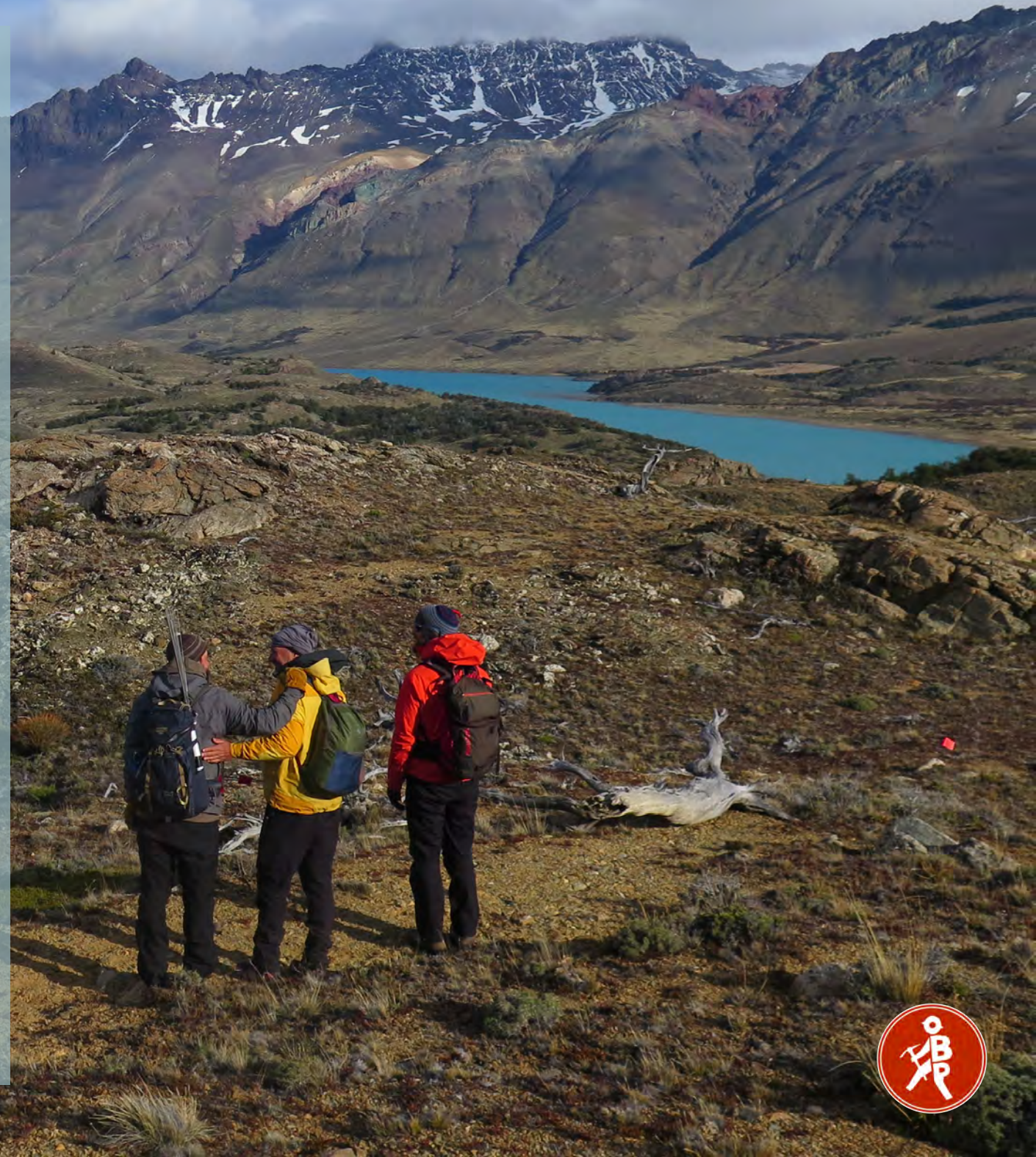
TIMELINE OF DEVELOPMENT PROCESS

- March 2017: BCF contracts OBP Trailworks, LLC to travel to Perito Moreno and train the new trail crew
- May 2017: BCF develops an ambitious development plan for the 2017-18 building season
- May - October 2017: BCF, OBP, and the Patagonian Partners tackle the logistics of achieving the development plan objectives
- November 5 2017- April 15 2018: The Patagonian and US teams successfully build over 60 km of trail, 5 huts, 7 latrines, and more
- June- August 2018: Second season objectives are established
- October 20 2018- April 10, 2019: The team builds another 30+km of trail, 4 huts, 10 latrines, 44 campsites, and more



SUMMARY OF THE HIDDEN LAKES TRAIL NETWORK DEVELOPMENT PROJECT GOALS

- To construct a world class hiking trail system with infrastructure in an underdeveloped National Park
- To create educational opportunities for the public
- To bolster concepts of sustainable trail design in Patagonia and beyond
- To leave a self sustaining system in place



IMPLEMENTING PROJECT GOALS

HITTING THE MOVING TARGET



IMPLEMENTING PROJECT GOALS

INFRASTRUCTURE DEVELOPMENT: HUTS



Construct at least 10 huts within walking distance of each other or a trailhead



IMPLEMENTING PROJECT GOALS

INFRASTRUCTURE DEVELOPMENT: CAMPING



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Design and construct tent camping areas near the huts in areas of most intensive use



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IMPLEMENTING PROJECT GOALS

INFRASTRUCTURE DEVELOPMENT: LATRINES



Construct latrines at trailheads, camping,
and congregation areas



IMPLEMENTING PROJECT GOALS

INFRASTRUCTURE DEVELOPMENT: ACCESS



Design and construct trailhead, parking lot,
and road improvements



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IMPLEMENTING PROJECT GOALS

INFRASTRUCTURE DEVELOPMENT: SHELTER

Install domes for temporary use, emergency shelters, and camping options



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Install domes for temporary use, emergency shelters, and camping options



IMPLEMENTING PROJECT GOALS

INFRASTRUCTURE DEVELOPMENT: SIGNAGE



Create and implement a comprehensive
and consistent signage plan



IMPLEMENTING PROJECT GOALS

INFRASTRUCTURE DEVELOPMENT: SIGNAGE

PENINSULA BELGRANO

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Estos senderos cruzan el paisaje suavemente ondulado de la Península Belgrano ofreciendo vistas espectaculares del Lago Belgrano y los cerros circundantes. Una de las particularidades más llamativas de Lago Belgrano es su coloración. La zona norte del lago posee este color singular ya que recibe agua de ríos que nacen de glaciares, las cuales contienen partículas en suspensión generando un color blanco lechoso.

The peninsula walking trails cross the gently undulating terrain of Peninsula Belgrano offering spectacular views of Belgrano Lake and the surrounding peaks. One of the most noticeable features of Lake Belgrano is its distinct color; the rivers which feed the lake start from glaciers and carry suspended particles which create the milky appearance.

CIRCUITO GRANDE

Distancia: 16,8 km
Tiempo: 5 horas
Dificultad: Baja

CIRCUITO CHICO

Distancia: 9,6 km
Tiempo: 3 horas
Dificultad: Baja

Emergencias: VHF Rx155 675 Tx150 375 sub141.3



sendero



mirador



refugio



zona de acampe
agreste



letrina



REGRESE CON
SUS RESIDUOS



CIRCUITO PENINSULA BELGRANO

PERFIL DE ELEVACION



USTEDES ESTÁN EN UNA ZONA AGRESTE
DE ALTA BELLEZA Y RIESGO. EVITE RIESGOS

Create and implement a comprehensive
and consistent signage plan



IMPLEMENTING PROJECT GOALS

EDUCATION: TRAIN LOCAL TEAMS



Insure that work is primarily accomplished
by Patagonian workers



IMPLEMENTING PROJECT GOALS

EDUCATION: TRAIN LOCAL TEAMS



Offer professional field support for each
construction crew



IMPLEMENTING PROJECT GOALS

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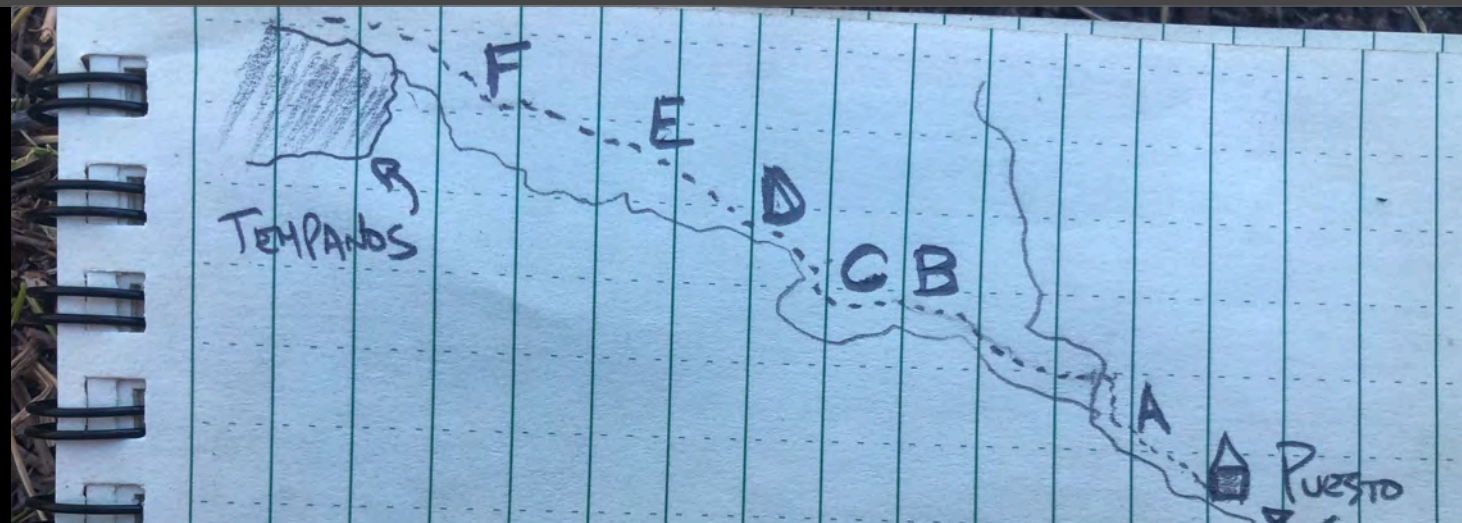


Mentor and train crew leaders in sustainable design and construction



IMPLEMENTING PROJECT GOALS

EDUCATION: TRAIN LOCAL TEAMS



A: PUESTO TO RIO HERMOSO → 750 M
 → 1-2 DAYS TOTAL
 → CAIRNS @ JCT. & STREAM XINGS
 → S.S. / RAMP @ GALLERY

B: RIO HERMOSO TO ROCK WORK → 1000 M
 → 2-3 DAYS TOTAL
 → NO CAIRNS IN FOREST
 → BRUSH SAW "HAIRCUT"
 → RAMPS MORE THAN STEPS
 → CAIRNS → 50 CM HIGH 50 M



ROCK WORK TO GATEWAY → 70 M
 → 2 DAYS TOTAL

D: GATEWAY TO STEPPING STONES
 → 1000 M; 3 DAYS TOTAL
 → 90 M BENCH + 70 M BENCH
 → MOSTLY REARRANGE

E: S.S. TO PLATEAU → 1500 M
 → 3 DAYS TOTAL
 → S.S. → 2 SHORT, 2 & 7 M LONG, 4 TOTAL
 → CAIRNS AT 50 CM, 50 M APART
 → MINIMAL TREAD WORK

F: PLATEAU TO END / VISTA → 1000 M
 → 3 DAYS TOTAL
 → 50-70 CM CAIRNS @ 50 M
 → REARRANGE TREAD ROCKS

Offer crew leaders tangible resources

IMPLEMENTING PROJECT GOALS

PHYSICAL SUSTAINABILITY: TMOS

TENT SITE, DOME SITE, AND ACCESS TRAIL DESIGN OBJECTIVES

Working sessions:

January 19, 2019 - Eduardo Depetris, Bicho Florenza, Pipa Olivieri, Diana, Jed Talbot, Charlie Howe
January 20, 2019 - Adrian Falcone, Eduardo Depetris, Tomas Bein, Pipa Olivieri, Will Tatiaferro
January 25, 2019 - Eduardo Depetris, Bicho Florenza, Jed Talbot, Charlie Howe
January 31, 2019 - Adrian Falcone, Eduardo Depetris, Bicho Florenza, Jed Talbot, Pipa Olivieri
February 2, 2019 - Jed Talbot, Charlie Howe, Sam Roberts

Trail Description

Site names: Puesto San Lorenzo, Río Lacteo, Archipelego, Dos Baías, Baia Nacurutu (Guanaco), La Angostura, Cascada Azara

Estimated length: N/A

Trailhead locations: Río Lacteo, Peninsula Belgrano, Puesto del Nueve

Purpose: ☒ Recreational ☐ Access ☐ Interpretive ☐ Historic

Primary + : Water access, hidden from main trail/refugio view sheds, protected from wind, safe from hazards such as falling limbs, proximity to latrine site

Notes: Trailside amenities will provide options for hikers to camp in all areas of the park where refugios exist and additional campsite locations.

Use

Designed for: Hiking/Camping

Allowed: Hiking/Camping

Prohibited: Biking, Horses, Motorized Vehicles

Traffic flow: Loop ☒ Out and back

Use Season: ☒ Summer ☐ Winter ☐ Both ☐ Other _____

Difficulty: ☒ Easy ☒ Moderate ☐ Difficult

Facilities: ☒ Latrine ☒ Hut ☒ Camping ☒ Signs ☐ Bridges

Notes:

Access Trail Construction Specifications

Tread width: 40+ cm (main access path) 30+ cm (between tent sites, dome sites, refugios and latrines),

Vertical protrusions – up to 10 cm accepted

Clearing: Corridor width 3 m, Platform width 1 m

Turn radius: Minimum 5 m, Optimum 8-15 m

Bank angle: 100 %*

Signs: ☒ Signs

Rock/Timber Steps: Steps will be used to connect facilities in confined and steep areas

Step height- up to 30 cm

Stepping stones: Stepping stones will be used in marsh areas

Size - 100 kg minimum in wettest areas, 50 kg minimum in drier areas

Spacing - 50 cm space between stones

Trail sustainability

Planned and designed: ☒ Professional design ☒ Inherited social trail

Alignment: ☒ Contoured ☒ Other: Alignment to avoid wetlands

Construction: ☒ Full bench ☒ Existing surface

Turns- ☒ Sweep turn ☒ Switchback ☐ Banked turn

Erosion prevention:

Water- ☒ Grade reversals ☒ Tread outslope at 2-6%

Wind- ☒ Leave root mat in exposed locations

Grade: Target for climbing leg 8% , Grade reversals at 5%
Maximum sustainable grade 15% , Maximum allowable grade 25%
Maximum allowable grade on bedrock up to 100% for short stretches

Durable tread: ☒ Mineral soil ☒ Root mat ☒ Imported ☒ Bedrock

Maintenance capacity: Minimal maintenance: clearing blow downs, brush saw clearing every two years or less

Tent and Dome Site Construction Specifications

Tent Site Size: 350cm x 350 cm, square, or 300cm x 400cm on slopes of 10% or greater

Dome Site Size: 400cm x 400cm, square

Surfacing: Mineral soil, gravel, small rocks, and/or sand, as available

Slope – 1-3%, pitched to drain

Vertical protrusions – None

Subsurface: Mineral soil, gravel, and/or small to medium rocks, as available

Slope – 1-15%, pitched to drain

Considerations – Subsurface rocks must be covered by a minimum of 5cm of surface grade fill

Clearing: Minimum 1 meter on all sides of platform, use appropriate clearing techniques

Slope parameters: 0%-10%- organic retention; 10%-20%- wood retention; <20%- not suitable

Retention specifications: 0%-10%- organic retention; 10%-20%- wood retention; <20%- not suitable

Create trail construction and management objectives and worksheets for each trail



IMPLEMENTING PROJECT GOALS

PHYSICAL SUSTAINABILITY: PLANNING



Discuss target demographics, carrying capacities, impact studies, etc.



IMPLEMENTING PROJECT GOALS

PHYSICAL SUSTAINABILITY: PLANNING



Insure that visitor resources are in place



IMPLEMENTING PROJECT GOALS

SOCIAL SUSTAINABILITY: EXTENDING THE REACH



Offer opportunities for National Park Staff to work and learn about sustainable trails



IMPLEMENTING PROJECT GOALS

SOCIAL SUSTAINABILITY: EXTENDING THE REACH



Local school programs



PRIMARY CHALLENGES

- Wicked remote location
- Ambitious outcome objectives
- Coordination between project partners
- Crew member experience levels
- Establishing objective trail standards
- Matching standards with production goals
- Cultural considerations
- Budgeting and payments
- Wind that will “blow the freckles off your face”



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- The ripple effect has just begun...



LESSONS LEARNED

- Pull in every possible partner and advocate
- Prioritize short and long term objectives
- Set the schedule and orient short term goals to it
- Double check your lists, then buy double
- Account for attrition and entropy
- Know what problems money can and can't fix
- Small comforts can go a long way
- Sometimes you have to give in to the wind



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Photo credits: Jed Talbot, Willie Bittner, Charlie Howe, Gabe Travis, Adrian Falcone, Tatiana Niveyro