

USDA-APGA/NAPCC
Tree Germplasm Conservation Partnership
2018 Catalina Ironwood Project Report

Submitted to:

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Background

In January 2018, the Santa Barbara Botanic Garden received funding from the American Public Gardens Association through its Tree Germplasm Conservation Partnership to collect and distribute seed of the Catalina Island ironwood, *Lyonothamnus floribundus* ssp. *floribundus*. Two subspecies of the monotypic *Lyonothamnus floribundus* occur only on the Channel Islands off the coast of central California. The subspecies *floribundus* is found only on Catalina Island, a small island (75 square miles) whose southerly range puts it at great risk for the impact of climate change. Island ironwoods are found in distinct, scattered groves containing from a few to more than 100 trunks. Genetic studies have shown that the species is clonal and that each grove contains a single genetic individual. Ironwoods are confined to a narrow range of habitat on their island refugia: primarily cool north-facing coastal slopes, often along small faults where they have greater access to water, and on sites with cold-air drainage. The most current survey data of Catalina ironwood indicates the existence of roughly 110 distinct groves distributed over the length of the island. The species is considered vulnerable on the IUCN Red list, carries a G2 global conservation rank, and is included on the California Native Plant Societies' Inventory of Rare and Endangered Plants on list 1B.2.

Objectives

The goal of the project was to conserve as large a sample of the genetic diversity of the taxon as possible by collecting seed and cuttings from natural groves on Catalina Island. We endeavor to establish a conservation collection of this subspecies at the Santa Barbara Botanic Garden as well as distribute to other gardens any plants and seed that result in our efforts. Eventually we would like to bring the taxon into wider cultivation as a further hedge against extinction.

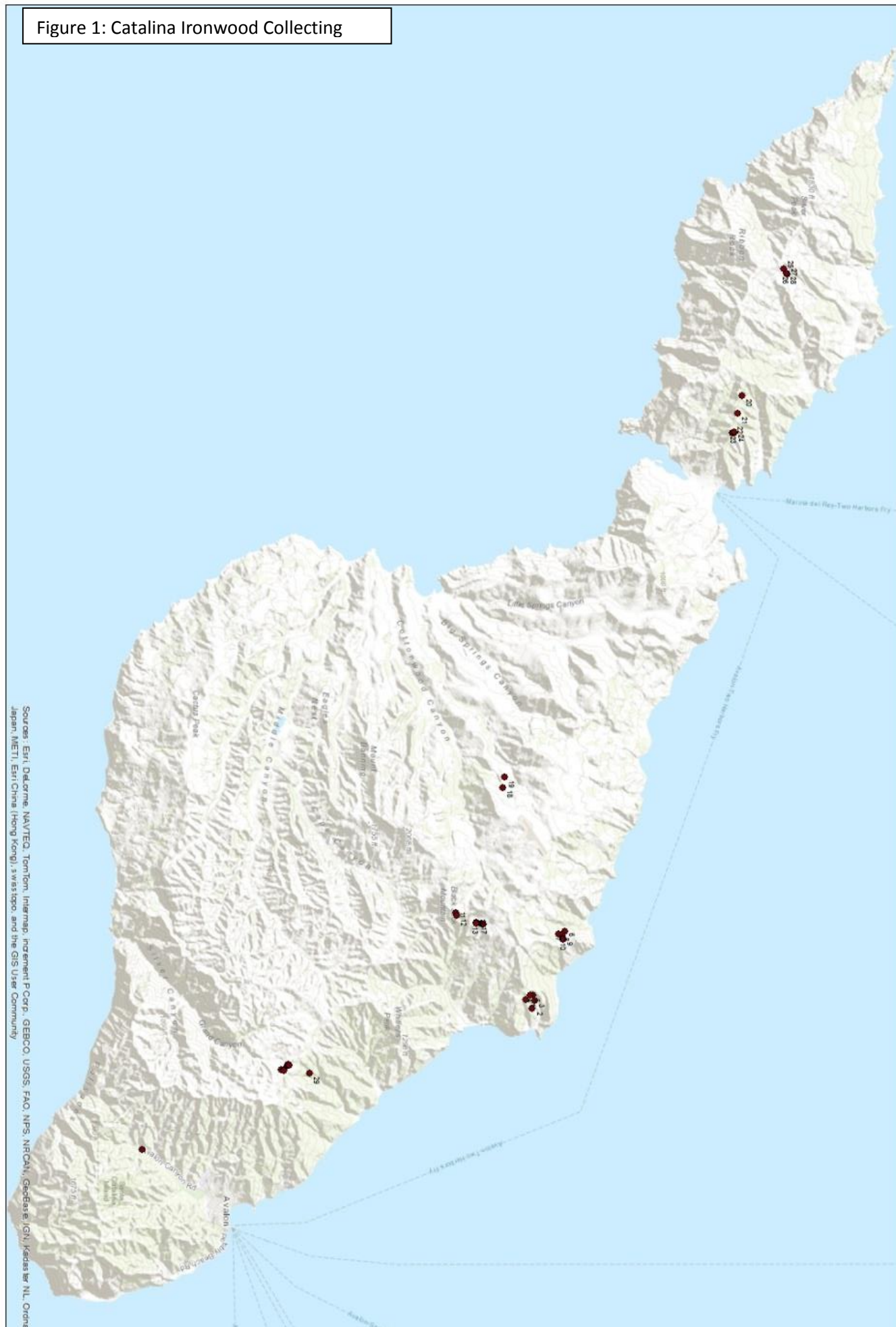
The scope of project activities included: collecting seeds and cuttings, accessioning, seed cleaning, testing seed viability, propagating cuttings, and distributing seeds and rooted cuttings to partners.

Outcome

Garden staff took two trips to Catalina Island in 2018; the first trip occurred in the spring from May 11-15, the second in the fall from October 19-23. The Garden worked closely with staff of the Catalina Conservancy who supported our efforts in many ways. Peter Dixon, Plant Propagation Manager was instrumental in providing on-island logistical support, maps and information about the location of the groves. The Conservancy allowed us access to their volunteer campground and field vehicles and drove us to remote spots on the island that required four-wheeled drive. In all, between the two trips, a total of 30 man/days of on-island field work were conducted not counting time devoted to planning, travel, propagation, record keeping, and seed cleaning.

Spring: For the spring trip, SBBG staff members Betsy Lape, Bruce Reed, and Heather Federlein, assisted by Peter Dixon of the Catalina Conservancy, visited 29 groves (Figure 1) to scout locations, and collect cutting materials, genetic samples, herbarium specimens, photographs, and site data. These site visits were critical in helping us plan for and maximize our efforts during the main fall fruit-collecting effort. We were able to map our routes, determine how much time it would take to hike to the groves and which groves were too difficult to reach. We were also able to assess what collecting gear would be required to reach the fruit. Each collection was assigned a SBBG accession number but we also assigned a number to each grove visited. For continuity sake, the grove numbers are cross-referenced to numbering system used by the Catalina Conservancy. Grove numbers are referenced in each accession record (Table 1).

Figure 1: Catalina Ironwood Collecting



Sources: Esri, DeLorme, NAVTEQ, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GEBCO, IGN, swisstopo, and the GIS User Community
Japan, METI, Esri China (Hong Kong), swisstopo, and the GIS User Community

The cutting materials (stem cuts only) were carefully labeled and bagged in the field and kept cold in coolers and in the camp refrigerator until they could be processed at SBBG. Approximately 350 cuttings were prepared and placed under mist in our propagation facility. None of the cuttings rooted over the course of the next five months which was not unexpected as ironwoods are known to be difficult to propagate vegetatively. We will continue our efforts experimenting with different methods using materials collected off trees in our own collections.

Fall: The main collecting effort occurred over 5 days in October 2018. We had a difficult time scheduling this trip as we heard various opinions about the readiness of the fruit. Monica Tydlaska, Plant Program Lead Technician for the Catalina Conservancy monitored fruit ripeness at several groves for us during August and September. In the end it turned out our October dates were perfectly timed to occur just about in the middle of the fruit ripening season. Rather than take two fall trips as originally envisioned, we accomplished our goals by taking multiple staff on a single trip.

For the fall trip SBBG staff members Betsy Lape, Betsy Collins, Wes Franken, Heather Federlein, and SBBG volunteer James Gardener were assisted by John Baker and Monica Tydlaska of the Catalina Conservancy. We visited the same 29 groves scouted in the spring and collected fruit from 21 of them (Table 2). We observed a highly variable fruit production between groves. Some groves failed to flower at all in 2018; others had flowered but lost their fruit during an extreme heat event in July. A few groves produced a great deal of fruit. We could discern no pattern to the fruiting success – we found groves laden with fruit adjacent to groves with no fruit.

Table 2: Catalina Ironwood Fruit Collections

Grove#	Collection Date	SBBG ACC#	Bulk Dried Fruit Weight
1	10/22/2018	18-056	471g
2	10/22/2018	18-058	0g
3	10/22/2018	18-059	39.2g
4	10/22/2018	18-060	0g
5	10/22/2018	18-061	0g
6	10/22/2018	18-063	502.6g
7	10/22/2018	18-064	95.1g
8	10/22/2018	18-065	468.2g
9	10/22/2018	18-073	139.1g
10	10/22/2018	18-074	183g
11	10/21/2018	18-080	86.4g
12	10/21/2018	18-068	95g
13	10/21/2018	18-088	0g
14	10/21/2018	18-089	31.6g
15	10/21/2018	18-090	0g

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16	10/21/2018	18-092	114.35g
17	10/21/2018	18-093	367.9g
18	10/22/2018	18-095	0g
19	10/22/2018	18-096	132.45g
20	10/20/2018	18-100	186g
21	10/20/2018	18-101	200g
22	10/20/2018	18-102	198.2g
23	10/20/2018	18-104	112g
24	10/20/2018	18-281	0g
25	10/23/2018	18-106	715.5g
26	10/23/2018	18-107	594.3g
27	10/23/2018	18-108	271.25g
28	10/23/2018	18-109	798g
29	10/23/2018	18-112	0g

Collecting proved extremely challenging given that the ironwood groves were usually situated on exceptionally steep slopes, often miles from any road. Our goal was to collect over as wide a geographic area as feasible and our collections were spread out over 16 miles of the island. We used pole pruners to gather fruit clusters high in the trees but the highest we could reach was about 25 ft. We employed a modified fishing net and a old parachute to gather the fruit as they fell. We collected as much of the ripe fruit as we could reach in each grove, which was always just a small fraction of what was produced.

Once back in the lab, we removed leaves and stems, then laid the wet fruit out in open trays to dry. We weighed the dried fruit as a measure of our collecting efforts. We are currently in the process of cleaning the seed and, as expected, are finding a low percentage of developed seed. The majority of the seed present in the follicles were unfilled, flattened husks having no obvious endosperm or embryo (Figure 2). After all the seed batches are cleaned, they will be weighed, then the germination and cut tests will begin.



Figure 2: Showing undeveloped seed (A) on left and developed seed (B) on right.

Threats

An increasingly dry climate over the last 20 million years has reduced *Lyonothamnus floribundus* to a highly restricted range on the Channel Islands. Our rapidly changing climate today is likely the greatest threat to the survival of this species. On Catalina Island, ironwood groves are trampled by introduced bison and browsed by introduced deer. However, even within large exclosures there is no evidence of recruitment of new seedlings which indicates that lack of pollen flow between these self-incompatible trees is a major threat to the species survival.

Participants

Primary contact:

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Other Participants:

- Betsy Lape, SBBG Living Collections Coordinator
- Heather Federlein, SBBG Plant Propagation Manager
- Bruce Reed, SBBG Horticulturist
- Wesley Franken, SBBG Gardener
- James Gardener, SBBG Volunteer
- Peter Dixon, Catalina Island Conservancy Plant Propagation Manager
- Monica Tydlaska, Catalina Island Conservancy Plant Program Lead Technician
- John Baker, Catalina Island Conservancy

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Expenses

Costs for conducting this project were basically as expected although some savings were realized in on-island travel and lodging. Staff time devoted to the project greatly exceeded even the generous match amounts in the original budget. We have included reimbursement for a few of those hours bringing the total invoice request close to the original budget. Please consider this report to be an invoice for \$5,970 for the Catalina Ironwood Project.

Budget for Catalina Ironwood Collecting Project				
	Grant Funds	Actuals	Match	
Transportation				
Mileage Santa Barbara/Long Beach	\$190.80	\$190.80		1 vehicle in May, 2 vehicles in October
Ferry fare Long Beach - Avalon	\$441.00	\$588.00		8 round trip fares
On island vehicle \$1/mile	\$1,500.00	\$600.00		
Parking at ferry terminal	\$324.00	\$300.00		15 days of parking
Lodging				
\$30/day/person	\$900.00	\$0.00		No charge for campground
Per Diem @ \$54/day	\$1,980.00	\$2,160.00		40 people days including travel
Equipment				
35 ft pole pruner & carry bag	\$389.98	\$369.98		American Tree Service
Collecting bags, seed envelopes	\$45.00	\$45.00		
Field Press	\$99.88	\$101.19		Herbarium Supply
Postage				
	\$130.00	\$0.00		Nothing to distribute yet
Staff Time				
				Duties
Betsy Collins @ \$45/hr			\$2,700.00	Planning, oversite, collecting, reporting
Betsy Lape @ \$22.25/hr		\$1,335.00	\$2,670.00	Planning, collecting, accessioning, mapping
Bruce Reed @ \$33/hr			\$1,650.00	Collecting
Heather Federlein @ \$28/hr		\$280.00	\$2,520.00	Collecting, seed cleaning and testing, propagation
Wes Franken @ \$20/hr			\$800.00	Collecting
SBBG volunteers @ \$24.14/hr			\$2,896.80	Collecting, seed cleaning and testing, propagation
Peter Dixon @ \$65/hr			\$6,500.00	Collecting
Monica Tydlaska @ \$50/hr			\$1,600.00	Collecting & monitoring
John Baker @ \$75/hr			\$600.00	Collecting
Totals	\$6,000.66	\$5,969.97	\$21,336.80	

Photos



Catalina Island. *Lyonothamnus floribundus* ssp. *floribundus* grove in its typical steeply-sloped habitat.



Catalina ironwood, showing glossy, entire leaves.



Spring field crew: Betsy Lape, Heather Federlein, Bruce Reed



Fall field crew: Wes Franken, Betsy Lape, James Gardener, Monica Tydlaska with harvested fruit.



Heather Federlein collecting cuttings in grove 23.



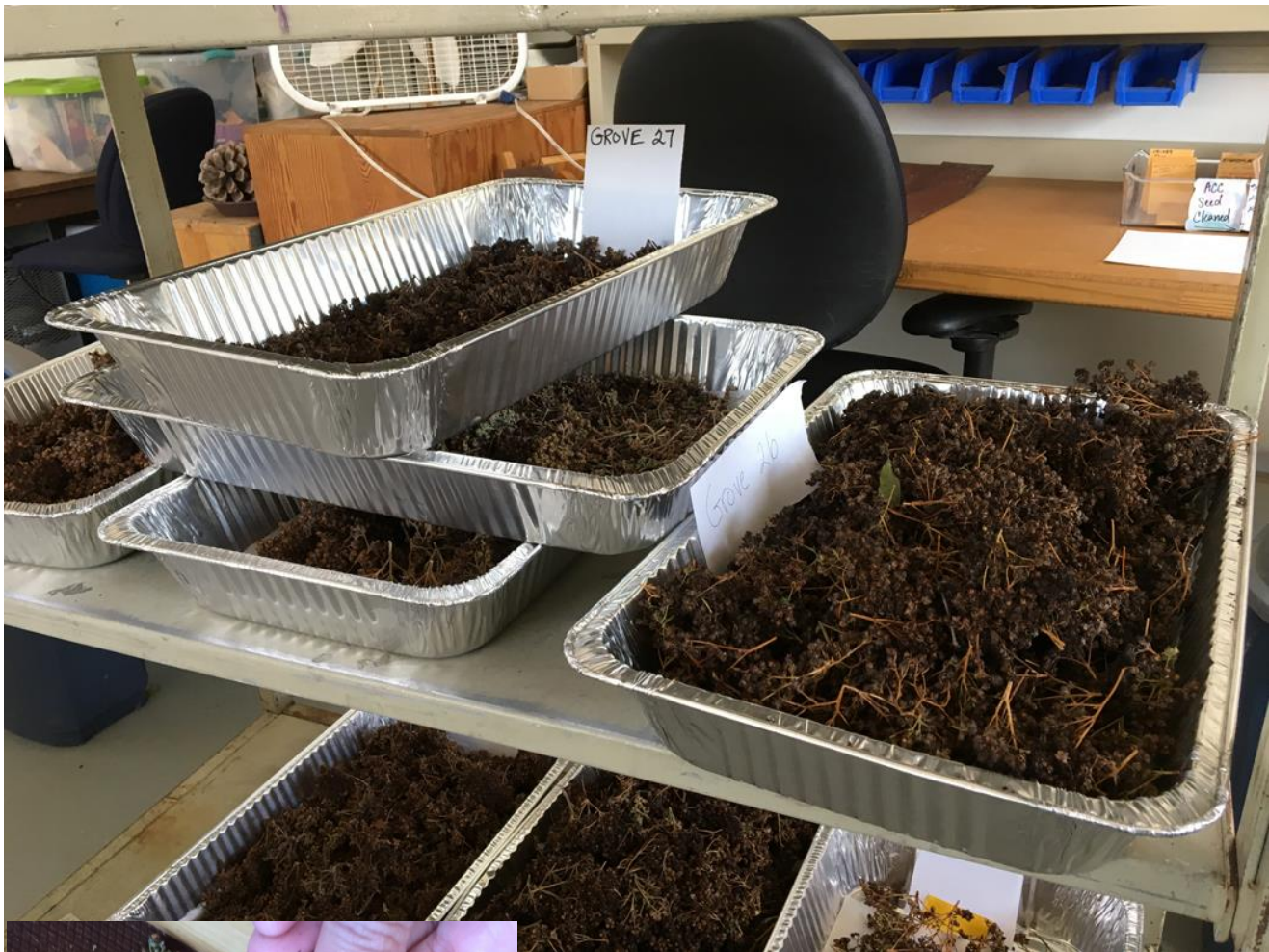
Betsy Lape negotiating the steep slopes in grove 22.



Collecting fruits with pole pruner and modified fishing net.



Using a parachute to catch fruit clusters as they fall.



Fruit being dried before cleaning. Preliminary cleaning process.

Table 1: 2018 Catalina Ironwood Collections

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- 18-056 *Lyonothamnus floribundus* ssp. *floribundus*. Prop Type: cuts & seed**
 USA, CA. Los Angeles County. Catalina Island. Grove 1. (45 in Cat_rare) 1 mile south of Buttonshell Beach; up canyon. We took the road past Echo Lake to get there and dropped down from the top.. Elev: 800ft. tan sedimentary substrate. Steep NW aspect. two significant individuals, one with 4 trunks, one smaller. Seed clusters from last year present.. With: *Adenostoma fasciculatum*, *Heteromeles arbutifolia*, *Quercus pacifica*, *Opuntia*, *Rhus integrifolia*, annual grasses.. Betsy Lape, Heather Ferderlein, Bruce Reed, Pete Dixon. 5/12/2018.
 Comments: Catalina Ironwood Project. Cuts taken in spring didn't root; the trees were noted to be loaded with ripe fruit, some at arm's reach but most required 12+ feet of pole to access. 5/2018 Seed was collected in October 2018, fruit weighed in at 471 grams.
- 18-058 *Lyonothamnus floribundus* ssp. *floribundus*. Prop Type: cuts**
 USA, CA. Los Angeles County. Catalina Island. Grove 2 (46 in Cat_rare). 3/4 mile south of Buttonshell Beach, up canyon. We took the road past Echo Lake to get there and dropped down from the top.. Elev: 430ft. the trees higher on the slope 12-18ft, lower trees 18-20ft tall & healthier. Infertile seeds on old flwrs, lots of suckers on burls. Flowers barely starting to emerge. With: *Rhus integrifolia*, annual grasses, *quercus pacifica*.. Betsy Lape, Heather Ferderlein, Bruce Reed, Pete Dixon. 5/12/2018.
 Comments: Catalina Ironwood Project. Cuts collected in spring didn't root, grove visited but no seed collected in fall.
- 18-059 *Lyonothamnus floribundus* ssp. *floribundus*. Prop Type: cuts & seed**
 USA, CA. Los Angeles County. Catalina Island. Grove 3 (103 on Cat_rare). 300 yards about water tower up canyon from Catalina Island Marine Institute at Fox Landing. We came down from Echo Lake Road., and crossed canyon by the *Prunus ilicifolia*.. Elev: 551'. steep NW facing. Many nice 12"+DBH trunks, 8-10 individuals ~15'-25' high. With: *Rhus integrifolia* in understory. Betsy Lape, Heather Ferderlein, Bruce Reed, Pete Dixon. 5/12/2018.
 Comments: Catalina Ironwood Project. Series of groves in this canyon, didn't visit another nice grove farther down and slightly north. 39.2 grams of fruit collected in fall.
- 18-060 *Lyonothamnus floribundus* ssp. *floribundus*. Prop Type: cuts**
 USA, CA. Los Angeles County. Catalina Island. Grove 4 (102 in Cat_rare). 1/4 mile west (up canyon) from water tower about CIMI at Fox Landing. We came down from Echo Lake Road, crossed the canyon by the *Prunus ilicifolia* and climbed the dozer line on the ridge.. Elev: 583'. steep west facing hillside. 23 trunks ~half under 12" DBH, also ~6 large >12" DBH trunks. Most shorter but trees lower on hill >25'. Island scrub. With: *Rhus integrifolia*, annual grasses, *quercus pacifica*. Betsy Lape, Heather Ferderlein, Bruce Reed, Pete Dixon. 5/12/2018.
 Comments: Catalina Ironwood Project. Cuts collected in spring did not root, grove visited but no seed collected in fall.
- 18-061 *Lyonothamnus floribundus* ssp. *floribundus*. Prop Type: cuts**
 USA, CA. Los Angeles County. Catalina Island. Grove 5 (Grove 99 in Cat_rare). Just over 1/4 mile west (up canyon) from water tower about CIMI at Fox Landing. We came down from Echo Lake Road, crossed the canyon by the *Prunus ilicifolia* and climbed the dozer line on the ridge.. Elev: 711'. Very steep west facing aspect. Twisting trunks in some individ. Lots of old flowers high on tree, @ 20 ft. less suckers. Island woodland. With: *Rhamnus pirifolia*, *Heteromeles arbutifolia*. Betsy Lape, Heather Ferderlein, Bruce Reed, Pete Dixon. 5/12/2018.
 Comments: Catalina Ironwood Project. Cuts collected in spring did not root, grove visited but no seed collected in fall.
- 18-063 *Lyonothamnus floribundus* ssp. *floribundus*. Prop Type: cuts & seed**
 USA, CA. Los Angeles County. Catalina Island. Grove 6 (120 in Cat_rare) 622 ft up Canyon above Goat Harbor. From the end of the dirt road go down the canyon to the northwest about 200 feet.. Elev: 622'. in a relatively flatter area halfway up canyon, grassy, rocky. Some eroded areas run through the grove. 1 large trunk ~2.5' DBH, 25' tall. Another group of smaller trunks to N. & a group of ~1.5' trunks to NE. With: *Opuntia*, grasses, *rhus integrifolia*, *quercus pacifica*. Betsy Lape, Heather Ferderlein, Bruce Reed, Pete Dixon. 5/12/2018.
 Comments: Catalina Ironwood Project. Cuts collected in spring, 502.6 g fruit collected in 10/2018
- 18-064 *Lyonothamnus floribundus* ssp. *floribundus*. Prop Type: cuts**
 USA, CA. Los Angeles County. Catalina Island. Grove 7 (Grove 41 in Cat_rare). Up canyon from Goat harbor, west of end of road about 50 feet down canyon behind rock outcrop. From Airport Road, unnamed road to the north of Echo Lake Road.. Elev: 828'. ~6 trunks <20', ~8-14" DBH. Betsy Lape, Heather Ferderlein, Bruce Reed, Pete Dixon. 5/12/2018.
 Comments: Catalina Ironwood Project. cuts collected in spring 2018 didn't root & 95.1 grams of fruit collected in 10/2018
- 18-065 *Lyonothamnus floribundus* ssp. *floribundus*. Prop Type: cuts & seed**
 USA, CA. Los Angeles County. Catalina Island. Grove 8. (Grove 155 or 172) Top of deep Canyon E. fork of Goat Harbor. From Airport road unnamed road north of Echo Lake road. At end of road, grove is west of road.. Elev: 868'. Betsy Lape, Heather Ferderlein, Bruce Reed, Pete Dixon. 5/12/2018.
 Comments: Catalina Ironwood Project. Cuts collected 5/2018 didn't root; 468.2 g fruit collected in 10/2018
- 18-068 *Lyonothamnus floribundus* ssp. *floribundus*. Prop Type: cuts & seed**
 USA, CA. Los Angeles County. Catalina Island. Grove 12. Propst Grove, Main Road, Exclosure Near turn off to Black Jack Camp Gate, South side of road, up hill.. Elev: 1426'. top of drop off above road, n facing. 25+ individuals, mostly 12-16" many standing dead trunks. Trunks close together, narrow canopies, sparse leaves. With: *Prunus ilicifolia*, *salvia mellifera*, *Ribes viburnifolium*.. Betsy Lape, Heather Ferderlein, Bruce Reed. 5/13/2018.
 Comments: Catalina Ironwood Project. (Cat_rare number 57) all cuts collected 5/2018 died and 95 g of fruit collected 10/2018
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- 18-073 Lyonothamnus floribundus ssp. floribundus. Prop Type: cuts & seed**
 USA, CA. Los Angeles County. Catalina Island. Grove 9. (42 in Cat_rare) End of road that turns east from airport road just north of Echo Lake Road turn. Above Goat Harbor. East of end of road and slightly down slope.. Elev: 819'. top of canyon, NE facing,. With: Dudleya prob. Virens hassei, Rhus integrifolia. Betsy Lape, Heather Ferderlein, Bruce Reed. 5/12/2018.
 Comments: Catalina Ironwood Project. Also several groves to east across canyon, above twin harbors that we didn't make it to, one large one low down in full flower. Cuts collected 5/2018 didn't root, 139.1 g of fruit collected in 10/2018
- 18-074 Lyonothamnus floribundus ssp. floribundus. Prop Type: cuts & seed**
 USA, CA. Los Angeles County. Catalina Island. Grove 10. End of road that turns east from airport road just north of Echo Lake Road turn. Above Goat Harbor. East of end of road and slightly down slope. Slightly east and downslope from grove 9. Elev: 821'. top of canyon, NE facing,. With: Dudleya prob. Virens hassei, Rhus integrifolia. Betsy Lape, Heather Ferderlein, Bruce Reed. 5/12/2018.
 Comments: Catalina Ironwood Project. Cuts collected 5/2018 didn't root; 183 g fruits collected in 10/2018
- 18-080 Lyonothamnus floribundus ssp. floribundus. Prop Type: cuts & seed**
 USA, CA. Los Angeles County. Catalina Island. Grove 11. (58 in Cat_rare.) Deer enclosure Propst grove near Black Jack campground gate, hiking /bison trail to the left goes up under/past Quercus pacifica and follows top on canyon to fence. 58 is near fence at top of canyon.. Elev: 1531'. Steep N facing, tan sedimentary substrate. 30+ trunks, many 12-16" DBH,. With: Opuntia, salvia mellifera, annual grasses, rhus integrifolia,. Betsy Lape, Heather Ferderlein, Bruce Reed. 5/13/2018.
 Comments: Catalina Ironwood Project. Cuts collected in 5/2018 didn't root; 86.4 g fruits collected 10/2018.
- 18-088 Lyonothamnus floribundus ssp. floribundus. Prop Type: cuts**
 USA, CA. Los Angeles County. Catalina Island. Grove 13. (Cat_rare 11) Ackerman Grove. Toward the NE quadrant of enclosure. Elev: 1266'. Shorter younger trees. Major tree burned in fire. Many stump sprouts, just starting to leaf out, no flowers yet. With: Ceanothus megacarpus insularis, Heteromeles arbutifolia, Adenostoma fasciculatum, Malosma laurina, Salvia mellifera, Lepechinia fragrans, Dendromecon rigida harfordii. Betsy Lape, Heather Ferderlein, Bruce Reed. 5/13/2018.
 Comments: Catalina Ironwood Project. Cuts from this stop may be from Grove 13 or 14; all 5/2018 cuts died, no seed collected
- 18-089 Lyonothamnus floribundus ssp. floribundus. Prop Type: cuts & seed**
 USA, CA. Los Angeles County. Catalina Island. Grove 14. (cat_rare 12) Ackerman Grove. NE section of enclosure. Elev: 1231'. In a draw, W facing aspect, nice amount of litter, annual grasses, more dirt,. Large trees, starting to flower. Trees fire scared. With: Quercus pacifica, Adenostoma fasciculatum, Annual grasses and Rhus integrifolia. Betsy Lape, Heather Ferderlein, Bruce Reed. 5/13/2018.
 Comments: Catalina Ironwood Project. Cuts and specimens collected 5/2018, all cuts died and 31.6 g of fruit collected 10/2018
- 18-090 Lyonothamnus floribundus ssp. floribundus. Prop Type: cuts**
 USA, CA. Los Angeles County. Catalina Island. Grove 15. (Cat_rare 13) Ackerman Grove. Most NE in enclosure, farther down draw toward base of canyon. Elev: 1182'. Very steep drop off to ravine. Rocky, lichen on rocks and oaks.. Very tall trees, around 25 trunks. Lots of acorns from acorn woodpeckers. With: Diplacus puniceus. Betsy Lape, Heather Ferderlein, Bruce Reed. 5/13/2018.
 Comments: Catalina Ironwood Project. Need pole pruners, flowers high and steep. All cuts collected 5/2018 died
- 18-092 Lyonothamnus floribundus ssp. floribundus. Prop Type: cuts& seed**
 USA, CA. Los Angeles County. Catalina Island. Grove 16 (Cat_rare 54) Blair Groves, SE end of deer enclosure, nice trails to groves, rock lined. Near the covered picnic bench area. Elev: 1225'. Mostly suckers, resprouts from badly burned old trees in draw. Hardly any flowers. East end grove has taller specimens. With: Dendromecon harfordii, Diplacus puniceus, Arctostaphylos catalinae, Polypodium, Helianthemum scoparium, Comarostaphylos diversifolia, Galium, Malosma laurina, Quercus pacifica,. Betsy Lape, Heather Ferderlein, Bruce Reed. 5/13/2018.
 Comments: Catalina Ironwood Project. Cuts from groves 16 & 17 all died. need pole pruners for seeds. 114.35 g of fruit collected 10/2018
- 18-095 Lyonothamnus floribundus ssp. floribundus. Prop Type: cuts**
 USA, CA. Los Angeles County. Catalina Island. Grove 18 (Cat_rare 133). Pass airport, road from airport to Little harbor,. Elev: 1094'. In creek below road, south of road. NW facing, steep aspect. Rocky. Sandstone. Nice stand, starting to flower. With: Opuntia, Quercus pacifica. Betsy Lape, Heather Ferderlein. 5/13/2018.
 Comments: Catalina Ironwood Project. Cuts collected 5/20108 all died; grove visited 10/2018 but there was no seed to collect.
- 18-096 Lyonothamnus floribundus ssp. floribundus. Prop Type: cuts & seed**
 USA, CA. Los Angeles County. Catalina Island. Grove 19 (Cat-rare 134). Pass airport, Road from Airport to Little Harbor, in creek N of road.. Elev: 973'. In creek. Very cool volcanic rocks, many colors.. Tall narrow straight trees. With: Rhus integrifolia, Salvia mellifera, Cercocarpus traskiae in wire cage. Betsy Lape, Heather Ferderlein. 5/13/2018.
 Comments: Catalina Ironwood Project. Cuts collected 5/2018 all died; 132.45 g of fruit collected 10/2018
- 18-100 Lyonothamnus floribundus ssp. floribundus. Prop Type: cuts & seed**
 USA, CA. Los Angeles County. Catalina Island. Grove 20 (113 in Cat_rare). West end. Isthmus road up from Two Harbors. Upper Cherry Valley, about 1 mile west of Cherry Cove. Around a quarter mile east of water tank road.. Elev: 971'. N facing grove. ~25 trunks, ~ 20-28' tall, ~12' wide spreading canopy. Medium amount of flower clusters. With: grassland, Rhus integrifolia, Diplacus puniceus. Betsy Lape, Heather Ferderlein, Bruce Reed. 5/14/2018.
 Comments: Catalina Ironwood Project. All cuts collected 5/2018 died. Need pole pruners for seed, 15' tall. 10/20/2018: some trees in few flowers, fruit is green maybe ripe, not much fruit at this grove. BC 186 grams of fruit collected 10/2018

- 18-101 *Lyonothamnus floribundus* ssp. *floribundus*. Prop Type: cuts & seed**
 USA, CA. Los Angeles County. Catalina Island. Grove 21 (Cat_rare 18). West end. Isthmus road up from Two Harbors. Upper Cherry Valley, about 1 mile west of Cherry Cove. From Grove 21, hike up to ridge, continue ridge on ridge, head down to North, on west side of canyon.. Elev: 904'. ~20 trunks, more flowers than grove 20, just starting to flower, going to have a lot of flowers. With: *Quercus pacifica*, *Adenostoma fasciculatum*, *Rhus integrifolia*,. Betsy Lape, Heather Ferderlein, Bruce Reed. 5/14/2018.
 Comments: Catalina Ironwood Project. All cuts collected 5/2018 died. 15' pole saw for seeds. 10/20/2018: lots of seed at this grove. BC 200 grams of fruit collected 10/2018
- 18-102 *Lyonothamnus floribundus* ssp. *floribundus*. Prop Type: cuts & seed**
 USA, CA. Los Angeles County. Catalina Island. Grove 22 (Cat_rare 61). 3/4 mile West of Fourth of July Cove. Upper Fourth of July Cove. Elev: 931'. Spreading canopies, reaching side branches, many flowers, very florific, earliest flowers yet. With: *Polypodium*, *Baccharis*, *Quercus pacifica*, *Rhus integrifolia*, *Primula clevelandii* ssp. *Insulare*. Betsy Lape, Heather Ferderlein, Bruce Reed. 5/14/2018.
 Comments: Catalina Ironwood Project. All cuts collected 5/2018 died. No pole pruners necessary, 10/20/2018 Small # of trunks, good flowering. 198.2 grams of fruit collected 10/2018
- 18-104 *Lyonothamnus floribundus* ssp. *floribundus*. Prop Type: cuts & seed**
 USA, CA. Los Angeles County. Catalina Island. Grove 23 (Cat_rare 63). 1 mile up Upper 4th of July cove.. Elev: 849'. steep west facing aspect. Some larger trunks, ~2' DBH some tall >25' outer branches spreading. Betsy Lape, Heather Ferderlein, Bruce Reed. 5/14/2018.
 Comments: Catalina Ironwood Project. Some low branches but for most amount of seed, 30' pruner, some very large seed heads. 10/20/2018: fruits mostly spent, killed in heat wve. BC 112 g of fruit collected 10/2018
- 18-106 *Lyonothamnus floribundus* ssp. *floribundus*. Prop Type: cuts & seed**
 USA, CA. Los Angeles County. Catalina Island. Grove 25 (Cat_rare 1). Slightly downslope from Silver Peak Rd. and Fence Line Road junction, to the north of road Boushay Canyon; this is the highest grove on the slope.. Elev: 1366'. Very windy. Very eroded red substrate, mineral soils, some leaf litter under trees. 18-20' tall, one large trunk 2.5' DBH, not many flowers from last year not in flower yet, vigorous growth last year, 10+ small seedlings. With: *Diplacus puniceus*, *Rhus integrifolia*, *Arctostaphylos catalinae*, *Pentagramma triangularis*, *Crocianthemum greenii*, *Heteromeles arbutifolia*, *Comarostaphylos planifolia*, *Baccharis*, *Isomeris*, *Galium Pseudognaphalium bicolor* and *californicum*. Betsy Lape, Heather Ferderlein. 5/14/2018.
 Comments: Catalina Ironwood Project. Apparent seedling recruitment. Additional genetic samples taken from apparent seedlings ~10. Seedlings ranged from a few leaves to 16" tall. All cuts collected 5/2018 died, 715.5 g of fruit collected
- 18-107 *Lyonothamnus floribundus* ssp. *floribundus*. Prop Type: cuts & seed**
 USA, CA. Los Angeles County. Catalina Island. Grove 26 (146 in Cat_rare) lower down canyon from Silver Peak Rd and Fenceline Road junction, down below very eroded hillside to the north of road, Boushay Canyon.. Elev: 1196'. West facing, a lot of downed wood on the ground and leaf litter. ~13 individuals many have narrow trunks,. With: *Arctostaphylos catalinae*, *Pinus*. Betsy Lape, Heather Ferderlein. 5/14/2018.
 Comments: Catalina Ironwood Project. No seedlings or resprouts, 26 & 28 may be one grove. All cuts collected 5/2018 died and 594.3 g of fruit collected in 10/2018
- 18-108 *Lyonothamnus floribundus* ssp. *floribundus*. Prop Type: cuts& seed**
 USA, CA. Los Angeles County. Catalina Island. Grove 27. Silver Peak Road and fenceline Road junction, down eroded canyon to the north of road. Boushay Canyon, spans point left by erosion from west to east, large,. Elev: 1184'. West facing, a lot of downed wood on the ground and leaf litter. 75+ trunks. Many low flowers. With: *Arctostaphylos catalinae*, *Pinus*. Betsy Lape, Heather Ferderlein. 5/14/2018.
 Comments: Catalina Ironwood Project. All cuts taken 5/2018 died and 271.25 g of fruit collected 10/2018
- 18-109 *Lyonothamnus floribundus* ssp. *floribundus*. Prop Type: cuts & seed**
 USA, CA. Los Angeles County. Catalina Island. Grove 28. Silver Peak Road and fenceline Road junction, down eroded canyon to the north of road. Boushay Canyon, highest most south and east grove in the bunch. Elev: 1207'. West facing, a lot of downed wood on the ground and leaf litter. With: *Arctostaphylos catalinae*, *Pinus*. Betsy Lape, Heather Ferderlein. 5/14/2018.
 Comments: Catalina Ironwood Project. All cuts collected 5/2018 died and 798.0 grams of fruit collected 10/2018
- 18-112 *Lyonothamnus floribundus* ssp. *floribundus*. Prop Type: cuts**
 USA, CA. Los Angeles County. Catalina Island. Grove 29. Downslope from Laura Stein volunteer campground in western canyon. Elev: 953'. W facing aspect. some old flower stalks at top of tree. 2 older burned trunks, ~24' high resprouts from fire. With: *Quercus tomentella*, some poison oak in creek. *Rhus integrifolia*, *Ceanothus arboreus*. Betsy Lape, Heather Ferderlein. 5/14/2018.
 Comments: Catalina Ironwood Project. Pole pruner for seeds. Also groves to East of canyon we didn't make it to. All cuts collected 5/2018 died and no fruit on the tree 10/2018
- 18-280 *Lyonothamnus floribundus* ssp. *floribundus*. Prop Type: cuts & seed**
 USA, CA. Los Angeles County. Catalina Island. Grove 17. Blair groves in Black Jack enclosure. Grove is north of grove 16 and lower in draw.. in draw that runs N/S. Mature, tall trees 10+ trunks. chaparral. With: *Arctostaphylos catalinae*, *Adenostoma fasciculatum*, *Malosma laurina*, *Quercus pacifica*, invasive grasses, *Opuntia littoralis*. Betsy Lape, Betsy Collins, Wes Franken, James Gardner. 5/13/2018.
 Comments: Catalina Ironwood Project. All cuts collected 5/2018 died, 367.9 g of fruit collected 10/2018
- 18-281 *Lyonothamnus floribundus* ssp. *floribundus*. Prop Type: none**
 USA, CA. Los Angeles County. Catalina Island. Grove 24. upper 4th of July cove.. Elev: 836. tall, broad canopy. Many trunks >2ft DBH (~10) 30'+ high. Betsy Lape. 10/25/2018.
 Comments: No cuts collected in spring, no seed collected in fall. Not really flowering & trees were really tall and hard to reach any material.