TROPICAL FIELD ECOLOGY AND CONSERVATION INITIATIVES ON THE OSA PENINSULA

Costa Rica, 1962-1973

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Introduction

One day in 1962, after a brief southbound flight from San José, a small plane landed on a grass strip clearing in Agua Buena de Rincón, a few miles west of Rincón Bay in the densely forested Osa Peninsula's northeast corner. Out of the craft clambered forester Leslie Holdridge and sociologist Joseph Tosi, two North Americans who were professors together at Turrialba's Instituto Interamericano de Ciencias Agrícolas (Interamerican Institute for Agrarian Sciences, IICA) (1). Holdridge and Tosi were co-founders that year of the San José-based Tropical Science Center (TSC), whose member foresters and other professionals consulted with governments and private sector clients on environmental and land use issues (2). The two consultants were in Rincón because Alvin Wright, manager of the North American-owned timber company Osa Productos Forestales (Osa Forest Products, OPF), had chosen to promote collegial relations with his fellow tropical foresters by inviting them to establish a field station for the TSC on OPF land, requiring only that they pay a nominal yearly rental fee for the two hectares leased. Holdridge and Tosi accepted the offer, erecting their Rincón de Osa field station building just south of the OPF airfield (3). Alvin Wright probably had little idea of the revolution in conservation oriented activity that visitors to this scientific outpost would soon provoke on the Osa Peninsula.

For the next dozen years, from 1962-1973, the station at Agua Buena de Rincón was visited by biologists, ecologists, foresters, geographers and other scientific researchers associated with the TSC and with the Organization for Tropical Studies (OTS), as well as by graduate students on OTS field science courses (4). These visitors, mostly foreigners, and well over 1000 in aggregate, were self-selected adherents to the objectives of furthering their own and others' understanding of tropical natural science. Professionally predisposed to appreciate the scientific value of their tropical wet forest surroundings, each station visitor bore witness to the ecological diversity and complexity

OSA PENINSULA

THE CORCOVADO BASIN (LA CUENCA DEL CORCOVADO) ON THE OSA PENINSULA, COSTA RICA
From *La Cuenca del Corcovado*, (Gainsville,1973)

Map 1.

of the nearly untouched Rincón area at the neck of the Osa Peninsula. Many also chose to expand their acquaintance with the Osa's physical environment beyond Rincón (5).

By 1973, when Al Wright's successor at OPF, Donald Allen, forced the TSC station to shut down permanently, many of its visitors had already formed an influential new constituency for the Osa Peninsula. They had a distinct agenda for the isolated region not shared by the local *precaristas* (untitled farmers) or by any of OPF's successive management plans. This largely foreign-born and trained "community" of biologists and other scientists sought the permanent preservation of all or some part of the exceptional biological diversity and natural ecosystems of the Osa Peninsula (6). They wished to protect these areas both for their intrinsic value and to facilitate concerted, long-term scientific study of the kind that had been carried out at Rincón station.

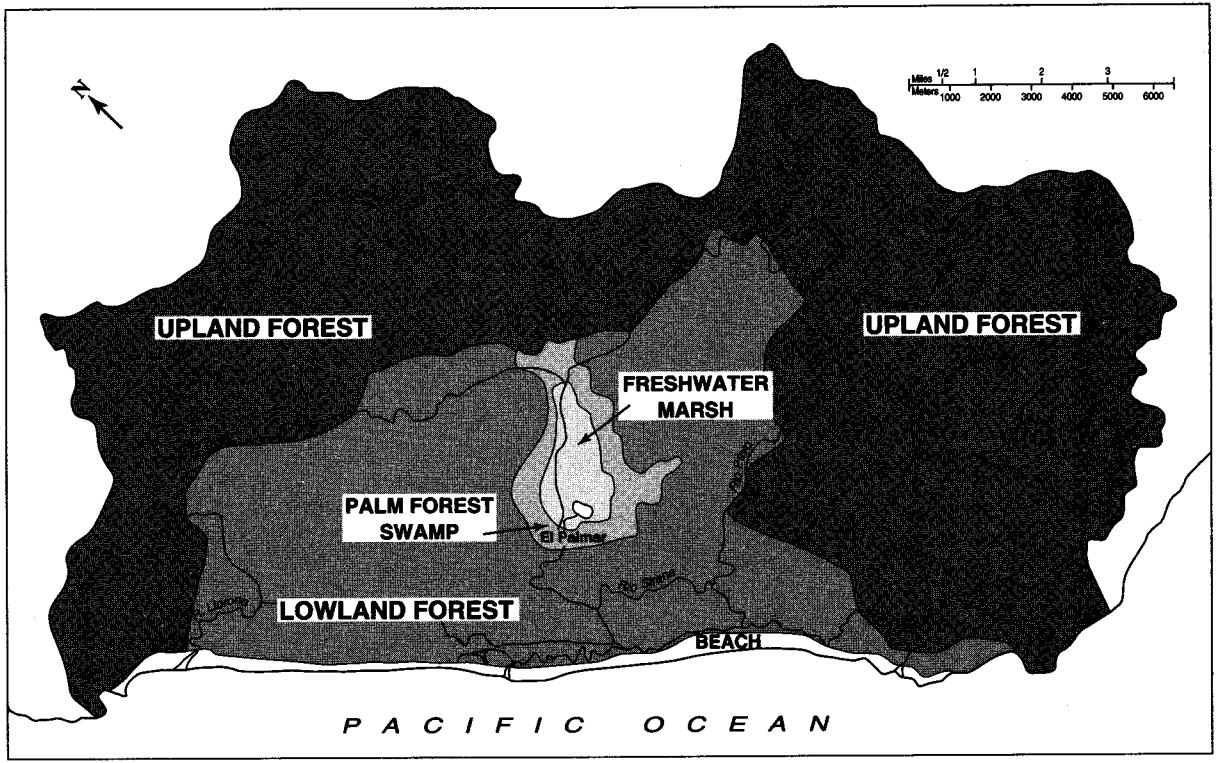
This essay explores the genesis and functioning of Rincón field station, illuminating how the station's presence catalyzed development of an Osa conservationist constituency. It chronicles how Rincón was constituted as part of a modern vanguard of tropical ecology field research and training stations. It then explores how Rincón station's existence led to scientific awareness of the ecological riches of the "Cuenca del Corcovado" or "Corcovado Watershed Basin" in the northwest Osa Peninsula. Briefly, the essay sketches the opposing Corcovado land use interests present by the late 1960s. It concludes by outlining some strategic scientific and political decisions that Osa conservationists, tempered by the Rincón experience, were approaching by the time the field station was shut down in 1973. This constituency's emerging consensus about feasible reserve location, administration, and political constituency would prove crucial to facilitating – and shaping – the 1975 creation of a 35,000 hectare Osa reserve, Corcovado National Park (7).

Rincón Field Station: Tropical Laboratory, Forest Classroom

Accounts of the creation of Corcovado Park routinely cite TSC's Rincón field station as the facility where the Osa's conservation partisans became acquainted with the Peninsula (8). These brief references explore neither why nor how Rincón station and its visitors came to their particular roles, nor do they place these developments in the larger context of the era's transitions in biology and ecology, particularly of the considerable changes in tropical forest field science between the 1950s and 1970s. Several factors affected the experiences of Rincón's visitors, and the development from their ranks of constituents (and constituencies) willing to seek a permanent natural reserve somewhere on the Osa. These factors include physical environment, research conditions (facilities and accessibility), researcher populations and their experiences, and the topics of scientific research and instruction at Rincón station. The importance of each factor was, in turn, affected by changes in tropical field science.

All these elements together created a complex of interests and relations providing the bricks and mortar to build a scientific constituency of variable cohesion, yet one whose influence ultimately led to the creation of Corcovado National Park. Knowing what the scientists possessed at Rincón station and in the Osa ecosystems in these years, and considering how these assets related to the changing standards and

Map 2.



LA CUENCA DEL CORCOVADO / THE CORCOVADO BASIN : ECOSYSTEMS

From *La Cuenca del Corcovado*, (Gainesville, 1973)

imperatives of ecological science, helps us understand what values scientists sought to establish and preserve in their campaigns for an Osa land reserve.

In a TSC report advocating the creation of Corcovado National Park (issued in 1975) Joe Tosi intended to leave no doubt that, notwithstanding the rustic conditions at Rincón station, environmental science on the Osa had not consisted merely of "traditional" natural history exercises, but was part of modern postwar theoretical inquiry in evolutionary, population, and ecosystem ecology (9). Few places like Rincón had ever become long-term scientific research settings before the 1960s. But by that decade a field station such as Rincón, located in a tropical wet forest setting, responded to certain contemporary demands of the rapidly developing field of tropical ecological science.

Historian Joel Hagen's study of the Canal Zone research station on Barro Colorado Island, Panamá, discusses how the early 20th century saw little development of tropical field stations equipped to expand upon the work of itinerant tropical naturalists (10). This was true in Costa Rica, where until the 1960s, field science strictly retained a traditional natural history taxonomy and systematics orientation. Significant as groundwork for the subsequent development of modern ecological science in Costa Rica, this research never approached the horizons of ecological theory (11).

By 1960 the discrete efforts of various U.S. universities to develop tropical science field programs in Latin America had drawn the attention of both the National Science Foundation (NSF) and the National Academy of Sciences-National Research Council (NAS-NRC) (12). In May 1960, the NAS addressed this interest by convening a "Conference on Tropical Botany" at the Fairchild Tropical Garden in Miami, Florida. The Miami Conference, funded by the NSF, was charged with assembling a picture of "the actual status of teaching and research in tropical plants" (13). The twenty-five conferees were selected from university science departments, government agencies, botanical gardens, arboreta, museums, and private research organizations throughout the United States. The few foreign-based participants included Leslie Holdridge (14). Several attendees were from universities that had been involved in efforts to sponsor Latin American tropical research centers or field biology programs during the 1950s. Among these were I. Duncan Clement of Harvard University, which had lost access to Cuba's Atkins Garden and Research Laboratory in 1959, and Stanley A. Cain of the University of Michigan, which in 1957 had launched an ultimately unsuccessful bid to develop a tropical research program in Mexico (15).

The Miami Conference has been described as "seminal in the development of a [United States] national awareness of the tropics". Though the conference was specifically focused on the progress of tropical botanical science, its conclusions have been judged to have established "the tone and framework for subsequent scientific efforts in training and research" in all branches of tropical science (16). Without reserve, the conference report extolled the potential for intellectual development inherent in tropical study, which "fosters the broad approach to taxonomy that is so essential to a firm comprehension of evolutionary history or to phytogeographic generalizations". For study of "ecological situations", conferees added, the tropics would provide an unparalleled opportunity for "the botanist to obtain a view of great diversity of environments with a minimum of travel, expense, and effort". Students of plant morphology,

physiology, even laboratory scholars of biochemistry and cytology, the report asserted, would all benefit from the unique experience afforded by "personal tropical experience" (17).

Conferees also advocated the wider development of tropical biological studies, including both basic and applied tropical ecology. They agreed that United States-led "Collaborative and cooperative undertakings... must in the long run merely stimulate or complement those conducted in tropical America itself". But they admitted that, presently, contemporary resources and training in the U.S. greatly exceeded those of tropical Latin America (18).

In part to address this imbalance, the conferees' particular concern was establishment of adequate field research and field training facilities, two requisites for advancing ecology in the American tropics that they concurred were fundamental and yet insufficiently available. An entire chapter of their brief report discussed the essential characteristics of the tropical research and training centers they advocated. Because understanding the tropics would be so important to developing ecological theory, the conferees called for "opportunities for all of the best young biologists to stay in tropical surroundings for several months, a year, or even a few years". This was to be accomplished by setting up tropical laboratories and by providing "stimulating and experienced teachers" to introduce students to "tropical problems". As good tropical botany training centers, these laboratories also had to offer "different types of completely tropical vegetation in its original state", as well as "local floras... an herbarium, ease of access, political stability, and availability of living quarters" (19).

For the scientists at this 1960 conference, sophisticated laboratory equipment was not the requisite to modern tropical ecological study it often would be a generation later, once tropical laboratories themselves were more commonplace. A more basic attribute, appropriate location, was deemed the key component necessary for tropical laboratories to provide the impetus to modern ecological research. Laboratory and training station had to be "practically adjacent" to rain forest or cloud forest ; more precisely, "the forest should be both laboratory and classroom". Significantly, the report carefully emphasized that the chosen forest setting must be undisturbed by prior human activity (20).

Rincón station, founded two years later, demonstrated by its attributes and functions that conferee Holdridge and his Tropical Science Center colleagues concurred with the research station priorities enunciated at the Miami Conference. The station's location and infrastructure facilitated nearby field investigations and field course problems in the emerging topics of modern tropical ecology. As long as Rincón station functioned, between 1962 and 1973, scientific research on the Osa remained concentrated on the Peninsula's gulf coast side. Scientists and graduate students based at Rincón devoted hours each day to observation and quantitative measurement at test plots and other precincts accessible to the station's local network of researcher trails.

Over the years, some of Rincón's student and researcher visitors may have been frustrated by lack of space, equipment and facilities. Yet they were provided with the full complement of station prerequisites enumerated by the Miami conferees : a politically stable country, living quarters adjacent to an undisturbed forest wilderness, ever-

improving local "floras", or species lists, and training led by expert scientific interpreters (21). Even with only a rudimentary field laboratory at their disposal, Rincón's 1960s researchers were well-equipped to advance modern ecological research on the Costa Rican tropical wet forest.

The physical environment of the Rincón area was necessarily a leading influence on the scope and tenor of Rincón station research from 1962-1973. The Rincón region's physical environment in the 1960s was especially appealing to Holdridge and other scientists interested in the tropical wet forest because any human imprint had remained subordinate to the natural features of the Rincón forest landscape. From the narrow coastal strip and mangrove swamp that together enclose the deep Rincón Bay's innermost pocket, La Bolsa, southwest to the wide Rincón River coastal plain and nearby hills, Rincón de Osa was virtually untouched by the Peninsula's modern-day settlers (22). With the arrival of Osa Productos Forestales, a dock, workers' houses, and other company constructions were built adjacent to La Bolsa (23). A little further inland, other OPF constructions, including the company's headquarters, along with Rincón station, clustered around the airstrip. The two development centers were connected by the Osa's first vehicular road, also built by OPF. As the scientists knew, more development was planned for this OPF operations center. OPF intended to build a wood processing plant and industrial dock at Rincón as soon as it could obtain the appropriate government permits (24).

Still, in 1962, the evergreen forest indisputably still held sway in Rincón, abutting on the airstrip, the company road, and the small construction clearings. Its tall trees prospered from nearly year-round precipitation averaging 4 000 millimeters (13 feet) per annum, and monthly temperature means of about 26 degrees Celsius (25). Along with species variety and characteristic lack of dominant species, the "outstanding aspect" of the station's setting was the height of the Rincón forest's overstory trees, many over 50 or 60 meters tall (26). Among the predominantly hardwood canopy trees were many potentially valuable lumber species, as Leslie Holdridge has noted (27).

Yet to Holdridge as to other Rincón station visitors, these forest conditions also bespoke scientific potential. Just as the Miami Conference had predicted, the need for basic taxonomic work to unlock this potential was evident at Rincón. Holdridge, by this time internationally recognized as a leading tropical dendrologist, humbly surveyed the rich storehouse of knowledge that lay untapped at Rincón: "there were trees we didn't even *know* then. I mean I found some that I couldn't even tell the family [they were in]" (28).

Visitors' consciousness of the vast challenge of the Osa's taxonomic wealth and its clues to the secrets of ecological theory probably was reinforced by the spartan research facilities at Rincón station. The station's research conditions, particularly its facilities and its relative inaccessibility, influenced both scientific research and, ultimately, the character of scientific partisanship on the Osa. The installation's modest facilities were congruent with the expectations for tropical research field stations laid out in the Miami Conference report. The station was a two-story wooden structure with a corrugated tin roof, its windows screened to allow air circulation while keeping mosquitos out. Dormitory and individual sleeping quarters were upstairs, with kitchen, showers and

work areas below. The work areas offered visitors tables, maps, some field guides, species lists, and reference books, and a few basic scientific supplies (29). Researchers and OTS courses were expected to bring what other equipment they needed. A gasoline generator provided the building with electricity so batteries could be recharged, stereoscopes illuminated and insect-trap lights and reading lights operated. A small propane-fueled refrigerator cooled film and perishables. Another propane tank served the gas-jet stove. Water was piped from a nearby stream, its purity celebrated in the locality's name, "Agua Buena". Local residents were hired to cook, machete the yard, and perform similar tasks (30).

Station access to both the Osa forest and to the outside world was similarly rudimentary. A network of researcher-blazed footpaths wended through the forest. Along one research path, dubbed the "Holdridge Trail", metal markers were keyed to a self-guided tree tour (31). The field station's only direct communication link with the capital, San José, and elsewhere was by two-way radio. Gasoline arrived from Golfito, across the Golfo Dulce, by outboard motor, then was jeep-driven over the 1.8 mile road linking Agua Buena with Rincón Harbor. Food and other supplies reached Agua Buena by plane from San José or Golfito, as did virtually all the station's visitors (32).

Researcher access to Rincón did not depend only on the skills of local pilots. It also hinged upon potential visitors' awareness of the station as a research destination. Rincón station was one of a vanguard of non-commodity oriented tropical field stations established on the Central American Isthmus during the 1960s, in a process catalyzed generally by postwar advances in ecology and in particular by events such as the Miami Conference. In the early 1960s the Smithsonian Tropical Research Institute (STRI) in Panamá, the former Barro Colorado station, was improved and expanded with NSF and Smithsonian Institution moneys (33). Similarly, in Costa Rica, Rincón became one of the first of a growing circuit of rudimentary field stations providing venues for short- and long-term research concentrated in systematics (taxonomy), population ecology, and ecological study of tropical ecosystems, as well as for field instruction in ecologically oriented concepts of tropical biology and forestry (34).

The composition of the "pool" of researchers who knew of Rincón through various institutional and personal affiliations, and the motivations and interests of those who actually found their way to the station, comprised crucial factors in ultimately determining who would be the Osa's scientist conservationist partisans. The Tropical Science Center and the Organization for Tropical Studies were the institutional conduits by which most visitors were likely to reach Rincón. The initial complement of potential Osa conservation partisans, the Rincón researchers, was chiefly drawn from associates, affiliates, students, and correspondents of these two organizations.

Both TSC and OTS were founded as institutions dedicated to tropical science research. TSC is a Costa Rican organization founded by North Americans, with affiliated researchers of both North American and Costa Rican background. OTS is a North American/Costa Rican organization, founded in 1963 as a consortium of six United States universities and the University of Costa Rica (35). OTS was fashioned by its founders to address "critical needs of teaching and research in tropical biology" (36). In 1964, OTS started

offering field courses, each lasting several weeks, in tropical science subjects new to most North and Central American university science curricula, including its flagship "Tropical Biology: An Ecological Approach", better known as the "Fundamentals" course. It also offered courses on tropical forestry, population ecology, and other specialized topics in tropical science (37).

At the time OTS was created, the consortium did not have its own field stations for training and research, and OTS biology and forestry courses regularly spent one to two weeks at Rincón by arrangement with TSC (38). In this optimal natural setting, the OTS courses gave students access to "inspiring botanists" and other environmental science experts, as the Miami Conference had counseled (39). Individual and team researchers, whether from member institutions like the University of Costa Rica, or, in Tosi's words, from "numerous independent universities and foundations from both the Americas and Europe" also arranged stays at Rincón, either through OTS or directly with TSC (40). Presumably, most of these researchers and students shared – or became persuaded of – many of the ecological, pedagogic, and research principles and interests the two institutions embodied at that time.

Throughout the 1960s and 1970s tropical science activity continued to grow, spurred by major "big science" initiatives such as the International Council of Scientific Unions' decade-long International Biological Program (41). As biologists Luis Diego Gómez and J.M. Savage relate, by then, taxonomy in Costa Rica emphatically was not any longer the central orientation of field work, as "the new ecological theories of the 1960s and 1970s were well understood, tested, and revised, and new ideas were generated by tropical field biologists interested in this exciting area" (42).

Rincón station had a part in the excitement of these research opportunities, offering far more support for research than Rincón researchers' scientific predecessors possessed in that environment. The station's prevailing long-term research agenda in both taxonomy and theoretical ecology capitalized on the excellent natural laboratory of the undisturbed Rincón forest. It benefited from the stability afforded by OPF manager Alvin Wright's willing cooperation, coupled with the benign neglect of the peaceful and democratic Costa Rican government. Like STRI, Rincón profited from the "big science" funding of these flush years. Rincón was a major field site for NSF-sponsored OTS courses, and for work such as Leslie Holdridge's multi-year *Forest Environments* study, funded by the Directorate of Remote Area Conflict in the U.S. Department of Defense (43). Theoretical elements of station-based research built upon a solid base in taxonomic observation and collecting, much of it owing to Holdridge's own *Forest Environments* research.

Accessible by air and *lancha* (motorboat), spartan but suitable for research support, Rincón station served as a magnet drawing scientists to the remote Osa. Under TSC and OTS auspices, virtually all Osa science research was carried out around Rincón (44). But as a secure anchorage, Rincón's presence also coaxed researchers to venture farther afield on the Peninsula than scientific explorers in Costa Rica's Zona Sur, or southern region, had previously been inclined to roam.

Rincón Station: Gateway to the Corcovado

On clement days, visitors to Rincón station who flew in to Agua Buena airstrip were greeted in all directions with vistas of wilderness – *selva* – and sea. Passengers whose pilots followed a Pacific coast flight path to Rincón may have chanced to circle wide over Corcovado Lake, the largest aperture in the otherwise nearly unbroken forest. Perhaps they saw the shallow lake's flat surface glinting with reflected sunlight, its edges completely hemmed in by stands of dark green *yolillo* palms (*Rafia taedigera*). The allure of potential discoveries in remote corners of this immense forest, beyond Rincón's local staging areas for long-term scientific research, inevitably piqued the natural history wanderlust many Rincón visitors shared with earlier generations of tropical field researchers.

Rincón station provided scientists with a degree of proximity to the remote northwest Osa not offered by earlier Zona Sur staging areas such as banana company facilities in Esquinas, Palmar Norte, and Golfito, or even by the Osa's only major town, Puerto Jiménez. One 1959 Osa visitor, German archaeologist Wolfgang Haberland, found that the Golfo Dulce coast was within the ken of his Puerto Jiménez informants. But the Osa's Pacific side was rarely integrated into their world, despite gold miners' trafficking between Jiménez and the Peninsula's Pacific coast mining hamlets since the 1937 discovery of placer gold.

Haberland, who explored more of the Osa than any other modern scientist prior to Rincón station's establishment, merely commented of the Osa's northwest that maps and aerial photos indicated "there is a considerable plain, where a North American company has started to exploit the woods and make cattle pastures" (45). Any pastures in these photos were likely made not by OPF but by the early untitled settlers on the Osa's northwest Pacific coast, a population unknown to Haberland and apparently unremarked by his Jiménez neighbors. Constrained by limited knowledge, time, and trails, Haberland ventured west of Jiménez only as far as the Rio Nuevo, at the southern end of the Peninsula's central hills (46). A trip to the northwest Osa would have required at least two or three days' bushwhacking from Jiménez.

During the 1950s and 1960s, airplanes landing at Llorona and other Pacific beaches carried only guerrillas, contrabanders, and gold traders, not scientists (47). In these years, scientists did not utilize the *lanchas* plying the Pacific coast, the favored settler transport from the coastal population centers of Puntarenas or Sierpe to the northwest Osa. But researchers arriving at Rincón station quickly learned that one hard day's journey by foot could take them to the edge of the remarkably diverse "Cuenca del Corcovado", or Corcovado watershed basin. Scientists' gradual acquaintance with the region eventually known as the Corcovado basin was a direct outcome of the concerted scientific involvement Rincón station had brought the Osa since 1962. Since then, itinerant scientists based at Rincón had been reconnoitering the Corcovado, developing a protracted collective acquaintance with environmental and social conditions on the Osa's Pacific slope.

"Corcovado basin" was an expression made popular in March 1973 by a group of conservation-oriented scientists associated with Rincón, in a privately published but widely circulated and influential bilingual booklet, *La Cuenca del Corcovado* (48). The

expression denoted a specific, geographically delimited region of especially high biological and ecosystemic diversity, located in the northwest sector of the Osa Peninsula. The booklet presented the biologists' view of the most important resources of the Corcovado, carefully delineating the basin's geographic parameters and cataloging its most prominent ecosystems:

> *The watersheds of the Corcovado Basin cover approximately 29,000 hectares (71,600 acres, 112 sq. miles). A flat plain stretches inland from the ocean for 7.5 kilometers 4.7 miles), terminating at the bases of steep hills that rise to elevations of nearly 600 meters (ca. 2,000 feet). Ten major streams surge downhill out of the wet forests that cloak these hills, slowing abruptly as they begin to cross the plain on their way to the sea. Lake Corcovado, nearly five kilometers long, lies at the heart of the drainage basin, surrounded by an extensive freshwater marsh grading into palm forest swamp, bottomland forest, and upland forest. (49)*

Among the "major streams" of this basin were the Sirena, Pavo, Claro, Brujo, and Corcovado rivers. Its coastal regions stretched from San Pedrillo, at the Osa's westernmost bulge, southeast through Llorona, Corcovado, Sirena, and Salsipuedes beaches. The Rincón drainage basin occupied the leeward side of the steep hills bounding the Corcovado's plains. Compared to the Corcovado, the more familiar Rincón basin contained a relatively limited diversity of distinct component ecosystems (50).

In the 1960s, Rincón's visitors embarked on the process of becoming acquainted with the Corcovado's ecological attributes (51). Rincón veteran Luis Diego Gómez recalls that curious researchers not infrequently chose to temporarily eschew Rincón's relative comfort and security to hike "over and across the hills" to Sirena, Llorona, and other destinations in the Corcovado basin (52). Visitors scheduled or stole a few days away from independent research timetables or used individual field problem days allotted on OTS courses to see the sights on the Pacific side. These explorers brought back preliminary observations about the flora and fauna of the Corcovado, perhaps accompanied by a few botanical specimens or some photographs.

Describing these early forays, Gómez conveys their improvised, secondary status for most visitors primarily intent on station-bound scientific education or research. Researchers hiked over to Corcovado "because it was scenically interesting, and there was a swamp [Laguna Corcovado] and all that... they decided that that was something to do..." By word-of-mouth these trips insured that "slowly Corcovado became known as a wildlife paradise, where you could see jaguars and tapirs without walking for two months in the hills. You actually saw them almost every day. It was obvious that the place was teeming with wildlife" (53).

As Gómez noted, initially the most striking feature of the Corcovado basin was the great quantity and variety of its fauna. The frequent sightings of elusive, solitude-seeking tapirs and jaguars indicated that this was a viable habitat supporting relatively high numbers of Central America's largest terrestrial mammal, the tapir, (*Tapirus bairdii*) and its largest carnivorous mammal, the jaguar, (*Felis onca*), species the explorers knew were nearly extirpated elsewhere in Central America, as the extensive geographic ranges they required were rapidly giving way to human colonization (54). The oft-remarked frequency of faunal sightings apparently exceeded what informed naturalists would

have expected even in an undisturbed region, and clearly contrasted with the rate of faunal sightings in the Rincón area. The faunal variety and presence in the western Osa was a strong indicator both of the area's lack of human disturbance and of its varied ecosystems' special attractiveness to the native fauna.

Seeing such numbers of jaguars, tapirs, and other large mammals caused the roving Rincón scientists to appreciate the relatively great extent and special faunal appeal of the "untouched" western Osa wilderness. Just so, the strikingly varied vistas encountered along the trajectory of the scientists' rambles began to alert them that this wilderness was made up of an unusually diverse collection of ecosystems, exceeding the ecosystem variety of the Rincón side. Five main ecosystems in the Corcovado basin were celebrated in 1973 in *Cuenca del Corcovado*: "Lake Corcovado... surrounded by an extensive freshwater marsh grading into palm forest swamp, bottomland forest, and upland forest". By 1975, scientists had identified "a score or more of ecologically-distinctive but closely-linked natural communities" in the Corcovado, creating, in such a relatively small area, a "rare combination and variety... unique to Costa Rica and perhaps to all tropical America" (55). With each passing year during the 1960s and early 1970s, the Rincón community amassed more scientific scouting reports from Corcovado. Many scientist-explorers managed to include a hurried trip to the Osa's Pacific side in their Rincón itinerary. The majority did not. But to all who pondered them, the subjective impressions and patchy data emerging from these Corcovado excursions strongly indicated that this Pacific region's notable faunal presence, high level of species and ecosystem diversity, and virtual absence of human involvement offered scientific promise even exceeding that of the Rincón side. The emerging composite picture of ecological and social conditions in the Osa's northwestern sector made the Corcovado appear a promising place to pursue contemporary research interests in evolutionary and population biology.

To scientists, biological diversity and complex species interaction constituted the Corcovado basin's main appeal. Full expression of these natural characteristics was predicated on local scarcity of farming, ranching, hunting, and other human industry in the basin. Rincón visitors' 1960s opportunity to explore the undisturbed Corcovado basin and reckon its scientific value was largely attributable to the nearly decade-long impasse between Osa settlers and the timber company, OPF, over their distinct land-use priorities for the northwest Osa. By the early 1970s, urgent new challenges to the integrity of the Corcovado's ecosystems were being raised by both settlers and OPF alike.

The Corcovado Basin: Two Development Imperatives

Until the early 1970s, little modern human activity took place within the area scientists eventually denoted as the Corcovado basin. Only a few early settlers had established farms around Sirena, in the heart of the Osa's northwest coastal zone (56). Isolation, wild boar herds, dense forest, and yellow fever were daunting hurdles for prospective settlers eyeing the interior of the Corcovado basin (57). But after 1962, probably the greatest obstruction to further *precarista* settlement in the basin had been the vigilance of Osa Forestal general manager Alvin Wright and his employees.

Osa Forestal, a Costa Rican-incorporated company with U.S. owners, had title to

about 100,000 hectares of land on the Osa, purchased in 1957 (58). Alvin Wright was hired in 1961 to develop a timber business on this land. In 1972 Wright retrospectively described the "Sirena Plain area" as having been "the most isolated and the most valuable part of the [entire OPF] property". Wright, intending to develop a long-term integrated forestry operation with forty-year harvest rotations, was determined to keep the Sirena settlement from spreading beyond those few farms his surveyors had mapped in 1963. He was equally resolute about keeping the occupants of those households from enlarging their farms, building roads, or conducting any other such activity that might sacrifice timber trees or improve living conditions and encourage further settlement. Throughout the 1960s, Wright and his staff had enforced rental contracts and carried out "energetic boundary maintenance, patrolling on foot and by airplane, legal harassment, etc". Using these tactics, Wright was able to cap settler influx to the Corcovado basin during the 1960s, while continuing to wade through endless government red tape in his attempts to attain permanent and exclusive jurisdiction over OPF property. Once he had such control, he felt, he would be able to proceed with his timber operation (59).

During the 1960s, untitled farmers continued to arrive on the Osa and to resist Wright's control efforts. By the early 1970s, settler pressures on the Corcovado area had intensified for reasons of both local and national origin. If yellow fever had been an inhibiting factor on the Osa in the 1950s, it was extirpated from the region by the 1960s (60). Population pressure was acute throughout Costa Rica by the early 1970s, with those born in the 1950s, at the height of the country's demographic boom, now grown and seeking land of their own. By the 1970s, settlers had become practised at allying with communist and left-leaning legislative *diputados*, or representatives, political champions of agrarian reform. These partisans often imparted strong nationalist and anti-imperialist overtones to the Osa land dispute. The frequency of land invasions throughout Costa Rica, sometimes spontaneous but often communist-aided, rose precipitously in the late 1960s and early 1970s. Prime targets for mass settlement were large uncultivated properties, particularly those owned by foreigners (61).

Regional and national interest in the Osa's destiny was heightened by the inception of special legislative committee hearings in 1971 about OPF's comportment on the Osa. At hearings conducted between 1971 and 1975 in a strongly nationalist climate, both Communist and "moderate" *diputados* projected expropriation of the foreign company's land and its various assignment to agrarian reform or, less often, conservation projects (62). Meantime, both Wright and succeeding OPF managers continued pressing their prerogative of permanent large-scale business development, attempting to exercise *de facto* control over the company's *de jure* titled Osa land. By 1971, Wright was fomenting radical new agricultural and ranching development plans in tactical response to squatter invasions of OPF property in the northwest Osa. Under new manager Donald Allen, OPF land use policy decisively shifted in mid-1972 from timber and agriculture to tourism and real estate speculation, abandoning any semblance of long-term forest management and conservation principles still cherished by forester Alvin Wright even towards the end of his embattled tenure. Intending to rely on brute force to expel settlers, manager Allen also abandoned company rental contract enforcement, increasing the opportunity for massive squatter invasions (63).

From Observation to Conservation: First Steps

By the early 1970s, Rincón scientists were well aware of the rising human settlement and development pressures confronting natural forest ecosystems throughout the American tropics. They were especially conversant with those threatening the ecological integrity of the Osa. Well before being shut out of their station research areas in 1973, Rincón scientists had begun calculating how to effect permanent protection of some part of the Peninsula for scientific research and conservation purposes. By 1973 Rincón scientists' nearly twelve years' station experience had paid off in key consensus decisions regarding both scientific and political strategy for a potential Osa reserve (64).

In scientific deliberations over what part of the Osa most deserved ecological protection, the summons of the Corcovado would have been difficult to neglect indefinitely, even though the area was not immediately proximate to Rincón. As the Osa's scientific explorers began tallying the special ecological merits of the Corcovado region, most notably its uncommonly high species and ecosystem diversity, the first outlines of a "Corcovado basin" conservation paradigm emerged. Significantly, this conservation paradigm reflected the ecosystem concepts stressed in the tropical ecology research and training Rincón station facilitated. The central tenet of this paradigm was that an undeveloped and entire Corcovado watershed, with all its component ecosystems, was requisite to an ecologically viable Osa reserve. By late 1973, after *Cuenca del Corcovado*'s authors had piloted a hard-won struggle to consolidate previously diffuse Osa conservation efforts, this scientific paradigm was generally adopted by Osa conservationists.

A key political tenet of Osa reserve creation was also generally accepted by Rincón's conservationist contingent by 1973. Like the scientific proviso of an intact Corcovado ecosystem, this political imperative also drew on these scientists' field station experience. Rincón scientists had observed a national political climate sensitized to any perceived foreign threats to Costa Rican land use sovereignty, and had witnessed the great antipathy Osa Forestal, as a foreign "landhoarding" company, had generated among Osa settlers and their political allies. In response, by 1973, Rincón scientists, not without debate, had adopted the political imperative that any Osa conservation project must derive from a Costa Rican initiative led by the newly created Costa Rican National Park Service (SPN). After that decision was widely accepted in the Rincón community, the mostly foreign Rincón scientists deliberately adopted low profiles in the reserve effort, often remaining quite active behind the scenes in the Osa conservation cause. Park service personnel correspondingly became the visible champions, and the actual leaders, of the Osa reserve struggle. In this process, an initial scientific interest in protecting a potential ecological field research site as a "scientific reserve" underwent an almost complete metamorphosis, emerging as the blueprint for a national park, symbol of the national "patrimony".

Having discussed how the Rincón experience promoted positive results for Osa conservation, it might be well to reflect on a long-term Corcovado Park liability traceable to a condition originating as a mere eventuality of Rincón station's scientific design. Just as the Miami Conference had advised, Rincón station was deliberately established

in the midst of "tropical vegetation in its original state", isolated from any regional population center (65). For a dozen years, Rincón's airstrip and amenities increased the Osa's number of scientific visitors and encouraged their acquaintance with the Osa's ecosystems. At the same time, these facilities effectively sequestered scientists from the individuals who ultimately became Corcovado Park's local constituency, namely the Osa's residents.

Rincón's published research and instruction were virtually limited to the English language, and despite sometimes lofty intentions, largely confined to North Americans and Europeans (66). Contact with local residents was limited to exchanges with station employees, consultations on tree species with "native woodsmen", or informal contracting of locals as trail guides (67). Intent on the study of native plants and animals, until the 1970s, few Rincón scientists ventured formally to learn about the Osa's human inhabitants' interactions with the Peninsula's natural resources and ecosystems (68). This pattern of isolation became virtually impossible to overcome in the crisis years just before the park's creation, by which time, despite an avowed interest in doing so, Osa conservationists had little opportunity to begin enlisting local settlers in the cause of the Osa's environmental protection. Rincón station's isolation from the Osa's population established a pattern of disjunction between scientists and residents that contributed to a long-held local perception of Corcovado as a park serving only foreign scientists, not the communities of the Osa Peninsula itself. While Rincón field station may be judged as having fallen short in providing its emerging conservation contingent with local community contact, it must be remembered that ecological study, not conservation, was the station's prescribed purpose. From a conservation perspective, Rincón exceeded expectations when it began to introduce North American scientists and graduate students to "personal tropical experience". Corcovado Park's conception and creation were inextricably tied to professional esteem for the Osa region's scientific merit, a direct outcome of Rincón field station's existence. The political decisions contributing to the park's creation are also traceable to the experiences of Rincón field station's conservation constituency. The political choice to support national park development and the scientifically calculated insistence on a complete Corcovado ecosystem reserve both proved key to the successful 1975 establishment of the Osa's Corcovado National Park, the "crown jewel" of Costa Rica's young National Park Service.

NOTES

1) Leslie Holdridge and Joseph Tosi, interview by author, tape recording, San José, Costa Rica, 13 February 1991 ; Joseph A. Tosi, "The Corcovado Basin on the Peninsula de Osa", draft chapter from "Potential National Parks, Nature Reserves, and Wildlife Sanctuary Areas in Costa Rica: A Survey of Priorities", World Wildlife Fund Project No. 801, [mid-1975], Monte Lloyd Collection in private hands (hereafter Lloyd Collection), 18 ; Christopher Vaughan, *Parque Nacional Corcovado : Plan de Manejo y Desarrollo* (Heredia: Editorial de la Universidad Nacional, 1981), 46, 154.

2) Luis Diego Gómez and J. M. Savage, "Searchers on That Rich Coast: Costa Rican Field Biology, 1400-1980", in Daniel H. Janzen, ed. *Costa Rican Natural History* (Chicago: University of Chicago Press, 1983), 7 ; Luis A. Fournier, *Desarrollo y Perspectivas del Movimiento Conservacionista Costarricense*, (San José : Editorial Universidad de Costa Rica, 1991), 58.

3) Holdridge and Tosi interview.

4) Tosi, "Corcovado Basin", 18, and Vaughan, *Corcovado*, 46, 154, establish 1962 as Rincón station's first year, but later sources offer conflicting dates: Gómez and Savage say 1966, in "Searchers", 7 ; Tosi, in 1991 interview, said 1964 ; most likely, an interim shelter was constructed by 1962-64, and the permanent station was erected by 1966.

5) Vaughan, *Corcovado*, 46 ; Tosi, "Corcovado Basin", 18, states that "more than 1000" students utilized the TSC center between 1964-1973. Non-course researchers using the station augmented this number. In the present essay, "Rincón" is written with an accented o. Usage varies in the primary sources ; most English language material omits the accent. A small plaque on the station's outside wall read "Tropical Science Center/Osa Field Station", but most contemporary documents refer to "Rincon", not "Osa" station.

6) The expressions "Rincón station community" or "contingent" are not intended to denote those people present at Rincón at a given moment, but to indicate all those with some experience of Rincón station who chose to become active in the Osa conservation cause (far fewer than the total number of Rincón visitors.)

7) A 1981 expansion increased Corcovado Park's size to about 41,000 hectares.

8) See Vaughan, *Corcovado*, 46, and David Rains Wallace, *The Quetzal and the Macaw: The Story of Costa Rica's National Parks* (San Francisco: Sierra Club Books, 1992), 56.

9) Tosi, "Corcovado Basin", 18-19.

10) Joel Hagen, "Problems in the Institutionalization of Tropical Biology : The Case of the Barro Colorado Island Biological Laboratory", *Journal of History and Philosophy of Life Sciences* 12 (1990) : 226-232.

11) Gómez and Savage, "Searchers", 9.

12) Donald E. Stone, "The Organization for Tropical Studies (OTS): A Success Story in Graduate Training and Research", in *Tropical Rainforests : Diversity and Conservation*, ed. Frank Almeda and Catherine Pringle, (San Francisco : California Academy of Sciences, 1988), 144-145.

13) National Academy of Sciences-National Research Council, *A Report on the Conference on Tropical Botany*, Fairchild Tropical Garden, May 5-7, 1960 (Washington: NAS-NRC, Division of Biology and Agriculture, Publication 822), iii. Following Donald Stone's example in "OTS", I refer to this as the "Miami Conference".

14) *Conference on Tropical Botany*, iii-iv.

15) Stone, "OTS", 144-145 ; *Conference on Tropical Botany*, ii-iii.

16) All quotes, Stone, "OTS", 145.

17) All quotes, *Conference on Tropical Botany*, 2. Cytology is the branch of biology concerned with the formation, structure, pathology, and function of cells.

18) *Conference on Tropical Botany*, 2-3, 9, 12-13.

19) All quotes, *Conference on Tropical Botany*, 7-8.

20) All quotes, *Conference on Tropical Botany*, 7.

21) A *Conference on Tropical Botany*, 7-8.

22) A few small farms likely predated OPF's arrival in Rincón. See OPF's 1963 "Reporte de las Fincas Ocupadas por Posedores en Precario o Invadidas por Parásitos", reprinted in Table VIII of Philip M. Fearnside's "An Estimate of the Carrying Capacity of the Osa Peninsula for Human Populations Supported on a Shifting Agriculture Technology", in *Report of Research Activities Undertaken During the Summer of 1972* (San José: Organization for Tropical Studies, 1972).

23) Francisco Medina, interview by Constance McDermott, notes, Rincón de Osa, Costa Rica, November 1992 and February 1993.

24) Holdridge and Tosi interview; the plant and dock were never built, since OPF's permitting efforts were unsuccessful; however, it was always understood by Rincón station's founders that the field station's setting was a developing forest industry center. More details about OPF's permit application process can be found in Expediente 5323 D A 24 E 5715, OPF Commission File, National Legislative Assembly Archives, San José, Costa Rica.

25) Tosi, "Corcovado Basin", 4.

26) Leslie R. Holdridge *et al.*, *Forest Environments in Tropical Life Zones: A Pilot Study*, (Oxford: Pergamon Press, 1971) 236-237.

27) Holdridge and Tosi interview.

28) Holdridge, (his emphasis) Holdridge and Tosi interview. By the early 1960s Holdridge's reputation as a tropical forester had already been established by his work in Puerto Rico, Costa Rica, and elsewhere.

29) Charles L. Hogue, *The Armies of the Ant* (New York: World Publishing, 1972), text and photo, 40-41.

30) Hogue, *Armies of the Ant*, 29-33; Alfred Meyer, "Foreword" to *Armies of the Ant*, xi; Charles L. Hogue and Julian P. Donahue, "Focus on Rincon", *Terra*, 10:4 (Spring 1972): 4-5.

31) Mildred Mathias, interview by author, notes, Los Angeles, CA, 24 September 1992; "Holdridge Trail", mimeographed document, Mildred Mathias Osa File, Department of Biology, University of California, Los Angeles, CA (hereafter Mathias Osa File), n.d., n.p.

32) Hogue and Donahue, "Focus on Rincon", 4-5.

33) Hagen, "Barro Colorado", 230-241; Commodity oriented stations include agriculture experiment stations established by agricultural industries, such as United Fruit, or by government agencies.

34) Tosi, "Corcovado Basin", 18-19.

35) University of Kansas became the eighth charter member at the first OTS board meeting, June 25-26, 1963; Stone, "OTS", 151-152.

36) Stone, "OTS", 148.

37) Stone, "OTS", Appendix 1, "OTS Courses, 1965-1987" provides a complete chronological list of OTS courses for these dates.

38) Joseph Tosi letter to Jorge Campabadal, 2 May 1969, Mathias Osa File; Gary Hartshorn, personal communication with author, 11 March 1994.

39) *Conference on Tropical Botany*, 7-8.

40) Tosi, "Corcovado Basin", 18.

41) Gómez and Savage, "Searchers", 91; Joel Hagen, *An Entangled Bank: The Origins of Ecosystem Ecology*, (New Brunswick: Rutgers University Press, 1992), Chapter 9, "Big Ecology", 164-188, is one of a handful of recent works assessing IBP's role in promoting ecology as "big science".

42) Gómez and Savage, "Searchers", 9.

43) Holdridge *et al.*, *Forest Environments*, "Preface". The Defense Department supported this work because of its pertinence to the Vietnam Conflict.

44) Tosi, "Corcovado Basin", 18; Jack Spencer letter to Huey Johnson, 30 March 1970, Mathias Osa File; Costa Rica, Ministerio de Agricultura y Ganaderia, "Report to the Director of the Forest Service on the Proposed National Scientific Reserve on the Osa Peninsula", mimeographed, [October 1972], 5, Lloyd Collection. This report describes the "upper parts of" the valleys of the Rios Rincón, Riyito, and Vanegas, "which drain into the Rio Rincon", as the site of most OTS and TSC studies.

45) Wolfgang Haberland, "Peninsula de Osa: Anotaciones Geográficas y Arquelogicas", *Informe Semestral del Instituto Geográfico de Costa Rica*, (January-June 1960): 80.

46) Haberland, "Anotaciones", 80.

47) For several months in 1959 (after Haberland's Osa visit) a rebel group plotting to overthrow Nicaraguan dictator Anastasio Somoza were encamped at Llorona, in the heart of the still remote Corcovado basin. See Charles D. Ameringer, *Don Pepe: A Political Biography of José Figueres of Costa Rica* (Albuquerque: University of New Mexico Press, 1978), 159.

48) The phrase "Corcovado basin" dates at least to August 1972; ecologist Jack Ewel coined it at a booklet-writing session at his home; Jack Ewel, interview by author, notes, San José, Costa Rica, 30 January 1991; Jack Ewel letter to Leslie Holdridge, 18 August 1972, Lloyd Collection. The term found general use when the brochure was issued in March 1973; *La Cuenca Del Corcovado: Península de Osa, Costa Rica* (Gainesville, FL: privately printed, [February-March, 1973]), Mathias Osa File; Jack Ewel and Douglas Pool, cover letter with *Cuenca del Corcovado*, 1 March 1973, Jack Ewel File (hereafter Ewel File), Barbara Lewis Collection in private hands (hereafter Lewis Collection).

49) *Cuenca del Corcovado*, 2.

50) Tosi, "Corcovado Basin", 8-9, 18-19. The Corcovado and Rincón drainage basins may each be considered an ecosystem, in turn divisible into smaller component ecosystems.

51) "Corcovado" and "Corcovado basin" are used here to describe this area even when referring to events previous to the 1973 publication of *Cuenca del Corcovado*. The term, thus employed, is retrospective, and would not have been in currency at the time of the events being described.

52) Luis Diego Gómez, interview by author, tape recording, San Vito de Coto Brus, Costa Rica, 22 July 1991.

53) Gómez interview.

54) Goméz interview; among other sources also citing these frequent appearances is *Cuenca del Corcovado*, 2.

55) *Cuenca del Corcovado*, 2; Tosi, "Corcovado Basin", 1.

56) Map, "Ubicación de Parásitos", emended version (5 March 1963) of *Plano de Finca Propiedad de Osa Productos Forestales, S.A.*, San José, June 1961, Institution de Tierras y Colonización Legal File on OPF (hereafter ITCO File), Lewis Collection. The region's indigenous population had disappeared by the eighteenth century.

57) Beltrán Quesada, interview by author, tape recording, Rincón de San Josecito, Costa Rica, March 1991; Alexander Skutch, interview by author, tape recording, Quizarrá, Costa Rica, 29 April 1992; Ewel interview.

58) Wilford Gonyea of Timber Products, Inc., Oregon, co-owned OPF with the Chicago-based Pritzker family, whose business empire includes Hyatt Hotels. Once a United Fruit property, this land sold in 1957 for about $450,000. The complex of early Osa Peninsula land transactions are traced in Catherine A. Christen, "Development and Conservation on Costa Rica's Osa Peninsula, 1937-1977: A Regional Case Study of Historical Land Use Policy and Practice in a Small Neotropical Country", (Ph.D. diss., Johns Hopkins University, 1994), 67-80.

59) Map, "Ubicación de Parásitos". All quotes, Alvin Wright letter to Carl [surname not indicated], 8 August 1972, Ewel File, Lewis Collection, 4. Subsequent references to this nearly 30 page letter include page numbers.

60) Ewel interview. Also, since 1963, the northwest Osa's settlers had begun to use chainsaws for forest clearance; Barbara Lewis, interview by author, tape recording, San José, Costa Rica, 9-10 May 1992.

61) Carolyn Hall, *Costa Rica: A Geographical Interpretation in Historical Perspective*, (Boulder: Westview Press, 1985), 154, 202; Wright to Carl, 8 August 1972, 4-5.

62) Minutes of the Legislative Assembly hearings on OPF are contained in Expediente 5323 D A 24 E 5715, OPF Commission File, National Legislative Assembly Archives, San José, Costa Rica.

63) Wright to Carl, 8 August 1972, 4-5, 8; [Douglas Boucher], "Plans of Allen Family for Osa", [August 1972], Lewis Collection; Douglas Pool letter to Joseph Tosi, 8 September 1972, Lewis Collection; Holdridge and Tosi interview.

64) The themes of early scientific and political consensus-building in the Osa conservationist community, and impact on Corcovado Park's 1975 creation, receive detailed analysis and documentation in Christen, "Development and Conservation on Costa Rica's Osa Peninsula", Chapters 3 through 6.

65) *Conference on Tropical Botany*, 8.

66) The first OTS Spanish language courses were offered in 1974; Stone, "OTS", 183; David B. Clark, "The Search For Solutions: Research and Education at La Selva Biological Station and their Relation to Ecodevelopment", in *Tropical Rainforests*, ed. Almeda and Pringle, 219.

67) Paul H. Allen, *The Rain Forests of Golfo Dulce*, (Gainesville: University of Florida Press, 1956), 91, uses the term "native woodsmen" in this context; Ewel, interview by author, discussed the practice of hiring local guides.

68) Perhaps the first Rincón researcher to pursue such a topic was zoologist Philip Fearnside, who wrote "An Estimate of the Carrying Capacity of the Osa Peninsula for Human Populations Supported on a Shifting Agriculture Technology", for a Summer, 1972, OTS Fundamentals course. Information in this document was later used to support the Corcovado park plan.

ABBREVIATIONS

IICA	Instituto Interamericano de Ciencias Agrícolas
NAS-NRC	National Academy of Sciences-National Research Council
NSF	National Science Foundation
OPF	Osa Productos Forestales
OTS	Organization for Tropical Studies
SPN	Servicio de Parques Nacionales (Costa Rica)
STRI	Smithsonian Tropical Research Institute
TSC	Tropical Science Center

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