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Joy of Complying

To learn how to stay on the good side of the law is akin to learning a new dance—stepwise, gingerly and cautiously. With practice, the steps become less awkward, the movements second nature. Effortlessness comes only when the fear of stepping on the partner's toes fades into the subconscious. That is the manner I started my lessons on how to stay in compliance with the Costa Rican laws as the administrator of the Nectandra Reserve. In tiny steps, often alternating with lurches, as a non-native, I learned to navigate the rules of the country to protect its extraordinary biodiversity, which in Costa Rica is governed by a framework of some 30 sets of environmental laws, attesting to the importance and value the country puts on its natural treasures. Ignorance was a blessing in disguise: it forced me to start with an uncluttered mind, taking nothing for granted.

The first brush with the environmental officials came up almost immediately after we took possession of the Nectandra property twenty years ago. My co-manager

Arturo and his crew were tracing the first few meters of trail on the property. The surrounding vegetation was profuse in this completely forested, uninhabited 104 ha property. The heavy ground-hugging clouds reduced visibility to just a few feet. They heard vegetation crashing less than 100m away. Thinking rotten branches or wild peccaries, they thought nothing of it. A couple days later, one of our men found several large sacks stuffed with wild orchids along the roadside hidden among the vegetation, but well inside the property line. Orchids thieves! Shortly after, our crew located the crime scene and evidence. A freshly cut tree was on the ground, its trunk cleaned of vegetation—standard *modus operandi* of the thieves. They must have followed the scent of the prized orchid, *Trichopilia suavis*, a heavily perfumed orchid but hard to reach high up in the canopy. Once they located the tree with the orchid, they simply chopped it down with their machete, collected the prize and stripped the trunk clean of more orchids. Removing the epiphytic orchids from a fallen the tree was so much easier than from a tall standing tree.

This was in the middle of the week. Guessing the thieves must be planning to retrieve the stolen goods later, on the weekend, Arturo laid a trap. He reported the illegal extraction of wild orchids to the environmental police and arranged to signal them as soon as the thieves show up. He and the crew then stayed out of sight and waited. Sure enough, that weekend, a truck pulled up in the vicinity of the sacks. A couple of men got out of the vehicle and walked into the Nectandra forest to retrieve the contraband. Our crew stopped them from leaving until the authorities arrived. The officers from the Ministry of Environment and Energy (MINEA) asked a few questions, confirmed that the men had no business there, took their names, wrote up a report, reprimanded the thieves, then let them go. The officials thanked Arturo and prepared to leave. Their actions were not as severe to the thieves as Arturo would have liked, but nevertheless in line with his expectation. The next move, however, was totally unanticipated. The officials were leaving with the orchids.

Arturo, startled, asked where and why the bags were being taken. "Standard procedures" he was told, "for stolen objects seized during robbery. They are being confiscated and taken to a holding place. For plants in this area, we take them to a convent where the nuns have agreed to care for them." "Do we get them back?" Arturo asked. "Not normally," came the answer. "But these were clearly taken from our property" protested Arturo, "Is there any way you can decommission them and release them back to us?" The policeman looked thoughtful for a few minutes while mentally calculating the work involved. Decommissioning the seized goods to either the convent or Nectandra required the same amount of paperwork, but it would save them a long drive to the convent if given to Nectandra. Happily for us, and too bad for the nuns, the orchids did not get transplanted to the convent. Had the officials denied our request, we would have no recourse. I have since learned that decommissioned goods in the US, as in Costa Rica, are possessions of the State in most states.

(As an aside, our crew recognized the thieves as regular riders on their commuter bus. Unbeknownst to us, there must have been two parallel working crews at Nectandra during that period, one legitimate and the other illegal.)

At the very basic and land owner level, in Costa Rica as in most western traditions (in contrast to nomadic and African societies), it is generally understood that proprietorship of the fauna, flora and other natural resources coincides with the boundaries of the property, with certain limitations. That is to say, the landowner is permitted to manage the land and use the resources on the surface as he sees fit, including the economic and other benefits derived from it. (There is a significant exception to this rule in Costa Rica that bears mentioning later in this discussion on research

materials). Ownership of the flora is not a problem as the plants are constrained to the land. Other natural resources on the property, such as surface runoff, underground water and mineral rights, are managed by the government. Under this system of allocation, rainwater belongs to the owner before it hits the ground and to the government after landfall. (This is not true in many countries and in most US states where all rainfall is regulated). Streams and springs are federally regulated. Sunlight and any other above ground resources belong to the owners.

The second situation caused us years of uncertainty and untold anxiety. Around 2003, the upper Balsa Hydroelectric II project progressed beyond the proposal stage and the pre-construction phase had already begun. The project was to provide supplemental peak hours electricity and involved the flooding of the small community of La Balsa, just 3 km south of the Nectandra Reserve, to form the reservoir to power two small electricity generators downstream some 30 km north of us. A 5 m (16 ft.) diameter tunnel would traverse underneath the Nectandra Reserve, across its entire width, to channel the water to the generators. Blasting would be used to construct the tunnel. In short, there would be massive construction, not just 270 degrees around Nectandra on the surface, but also regular explosions from the dynamite underneath. Unfortunately, Nectandra had no grounds for complaint, because on paper not an inch of the reserve was affected, just everything around and underneath our soil!

The only way we knew how to prepare and to evaluate the project was to use the deep fact-finding approach. We quietly searched out as much public information and documentation—potential ammunition as and when necessary—on the project as we could. In addition to chasing after the official environmental impact studies, we hired our own consultant to do an independent mini assessment. His final analysis provided the best news we could have hoped for. Differing substantially from the government's evaluation, his revealed that the project had at least one fatal flaw. Even by pooling the flow from four regional waterways during the wet season, the total amount of water collected could provide only 2.5 hours (daily) of power generation, not enough to justify the total cost of the hydroproject. Ironically, while we were calmed by the near certitude that the project was neither strategically nor financially justifiable, we nervously watched the government going forward for several more years, including making key land purchases from our neighbors in preparation. Thankfully, the project suffered from a series of postponements and delays due to fiscal mismanagement, and was suspended in the aftermath of the 2007 financial crisis. Years after the suspension the government, in its final analysis, determined that the Balsa hydroproject II was fiscally impractical after all and it finally died a peaceful death.

This episode was a clear lesson that proprietorship is necessary but insufficient, that the fence line is no more than an imaginary protection barrier for the well being of the wildlife. What happens "outside" affects the "inside". We live in a spherical world. There are no sides.

The third tutorial dealt with the necessary permits to study the native flora and fauna, for our internal investigations as well as those for our collaborators from academic institutions abroad. Coming from the US with a background in scientific research, I had assumed it to be a straightforward task. Wrong.

In the US, researchers and educators do not need permits to do biological research *per se*. Collecting permits are required for organisms on federal or other public land, but if access to private property is not a question, collecting permits are required only if the specific organisms are on the official endangered list.

Such is not the case in Costa Rica. The government is very protective of the country's biodiversity. The environmental laws are comprehensive in their scope and quite vigilant in their intent. *All* scientific studies on the biodiversity require both a research permit and a separate collecting permit. These regulations apply to any investigating or teaching involving the handling of live plants and capture of animals, even if they are later released. The application must have a research plan (or course curriculum), CV's of all researchers, a detailed list of the quantity and of the organisms (down to species) involved and a detailed chronogram of the anticipated work. The investigators must also agree to deposit a duplicate set of specimens with a Costa Rican sanctioned institution and submit reports/publications derived from the studies. The issued permit, valid for 6 months, comes in the form of a scientific passport with the standard photo identification.

Scientific passport

Over the years, I needed many permits to do various investigations at Nectandra. In the pre-digital era, it was a long drawn out process. We hotfooted all the documents to be submitted to the centralized office in San Jose after a long drive. If approved, the passport had to be signed in front of the official in charge. It was a one-person office,

without an appointment system. Every visit was a hit-or-miss. As expected, the earliest applications were the most difficult and went badly, with many wasted trips, phone tagging and other miscommunications with JG, the man in charge. The tiny office moved several times, each time to one slightly bigger. JG moved with it but did not get additional help. Over time, in our short and mostly perfunctory conversations, I realized that JG was not in good health and missed work for medical reasons, including open-heart surgery. That explained the unanswered phone calls, his absences from the office, and extended delays with the permits. During the transition from paper to digital application, the beta-phase software was full of annoying bugs (*e.g.*, one dropdown menu for moss genera insisted on listing only cacti species), and led to many unintended crashes. It took many months to resolve the stalemate. But there is hope and progress. What used to take months now take weeks and JG is still on the job.

We now come to the most recent struggle to comply with our contract with the federal Payment for Environment Services Program (PES). Costa Rica is the first nation to use this monetary incentive program to compensate landowners for environment benefits generated by forests. The latter includes carbon fixation and storage, water collection, natural resources and beauty. In practice, Nectandra is paid between $USD 60-70 /ha/year to maintain the existing forest, preserve fauna and flora, protect waterways and riparian spaces. Prohibited are large scale development, extraction of minerals, disturbance of fauna and flora. PES, as a program, went through many hiccups and has provided fodder for skepticism and critical assessment by numerous environmental scholars during its existence. To its credit, the government has been surprisingly open to criticisms and scrutiny of its policies, and to periodical policy realignment to remain true to the original objectives. Each modification, of course, had a dribble-down effect to the recipients' manner of compliance. It was and still is an imperfect and slow process. But in spite of the difficulties, the government's steadfastness and flexibility are paying off. After 30-some years, measurable net increase in forest cover can be directly attributed to the program, as indicated in recent independent scientific publications.

The goals of PES and Nectandra coincide perfectly, so what is the problem? The problem has to do with the recalcitrant poaching. Not only are we as PES recipients prohibited from hunting, we must *actively* protect the wildlife, period. Of all the regulations, hunting is becoming the bane of our existence in an otherwise very beneficial arrangement. Costa Rica became the first country to ban hunting outright. Legally, it is a black and white issue, but it did nothing for our PES compliance and enforcement problem in the field. The difficulty is not of catching the poachers. The question and dilemma are what to do with the men and with their dogs once we have them.

There has always been hunting at Nectandra Reserve. Before our arrival on the scene, the absence of residents in the previous decades meant hunters and plant thieves could ply their work with impunity. After our arrival, the illegal traffic was almost, but not completely, stopped by our ranger's daily patrol and general vigilance. We were delighted to watch the prey population increase steadily over the years, as indicated by our camera traps. At the same time, the predators, felines (pumas and jaguars) and alarmingly, humans with their hunting dogs, also started to reappear in hot pursuit. The poachers' favorite prey are two very large rodents, the diurnal agoutis and the nocturnal tepezcuintles. Another favorite is the collared peccary. All are prized for their meat. They are hunted primarily for sport.

Agouti

Tepezcuintle (photo from Wikipedia)

Our policy is to use civil engagement and firm warning whenever possible. No weapons and no physical confrontation. We tried every known approach, including publicity (warning signs and flyers), dialogue (meetings with the hunters since we know who they are), monitoring and fines. Nothing eliminated the problem and it simmered for many years.

The hunting dogs presented a different kind of problem. They are usually starved in preparation for the hunt. They arrive hungry and attack the prey they were trained to find. The poachers mostly stay out of sight during the hunt, but the dogs are laser focused when driven by the scent of prey. The presence of our crew nearby slowed them not one whit. It was easy to catch many of the dogs. Each time, we removed them from the reserve, transported them to a willing animal shelter. We pay the shelter to get the dogs neutered (to decrease their hunting instinct), vaccinated, and fed while waiting for adoption by non-hunters. It is a very expensive transaction for us, but we count on the equally high cost of dog replacement for the owner as the deterrent. This approach seemed to work until recently. The shelters are filled to capacity

and are not accepting more animals. At the same time, a new wave of hunters and their dogs started showing up.

With heightened vigilance, our crew began to put together the poachers' *modus operandi*. At 6 o'clock on weekend mornings, a truck driven by the wife of the leader would drop off her husband, the hunting companions and three hunting dogs on the north boundary of the reserve. She would return to pick them up at a later appointed time. All the recent dogs were caught during that interval. By now, we know who the leader is and recognized him as a repeater. In a previous run-in, his dog was returned with a warning that there would be no repeat. In his eagerness to get his dog, he even signed a confession admitting to his illegal hunting at Nectandra. In the more recent occasion, we caught one of his dogs during a chase and mauling of the prey. Unlike the last episode, he discovered that his dogs would not be returned. He insisted, accused us of theft (of his dog), then threatened our crew with violence. The following week, he came back with more dogs, more hunting, more threats when the caught dogs were not returned, followed by a rash of vandalism at Nectandra, forcing us to involve the police and the criminal court system. Hunting is now a felony and subjected to large fines, but the jails are already full and the courts are jammed.

Thinking that strength comes with numbers, we have formed an *ad hoc* network to include neighboring reserves (who are having the same problem), other players and the police, to exchange information, and to find possible approaches and workable solutions. Events are still unfolding. It will be years before we resolve our current dilemma with the suspect, but worse, the end of the hunting problem is nowhere in sight.

The above are just a few of the many watershed moments that gave me pause over the many legal issues and responsibilities associated with stewardship of the reserve's biodiversity, especially in the context of private land in Costa Rica. Some occasions, in retrospect, were amusing, others harrowing, but all thought provoking. Staying in compliance on biodiversity regulations turned out to be a hugely complex, shifting topic that does not settle. My fear of stepping on toes remains to this day.

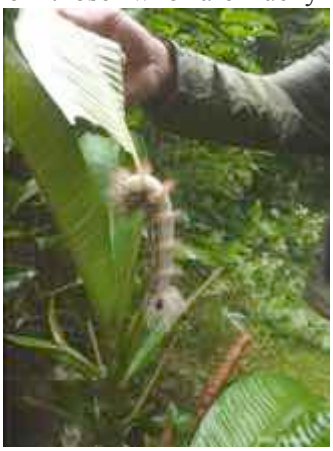
—— *Evelyne T. Lennette* ——

Come and join us at Nectandra to experience

Serendips!

What is a serendip?

A chance encounter, an unexpected discovery, a happy accident, a startling fluke, an unforeseen experience, a fortuitous involvement, an unintended contact, a sudden insight, and so many more . . .



For those who are lucky enough to work at the Nectandra Cloud Forest Reserve, serendips are part of the work sphere. We can no more avoid them than the air we breathe in. But unlike air, serendips are always unexpected and memorable. They can take our breath away, shock us into silence or make us scream. Invariably, they compel us to whip out the camera to capture the moment, so that we may later reflect, prolong the excitement, share or simply document and learn.

Serendips challenge our mind's readiness for discovery. They often give no warning. They do not advertise. Our ability to detect and experience them rests on our mind's readiness and alertness.

Just as all irrepressible children with their memorable discoveries, we at Nectandra want to share the excitement of our numerous serendips with the nearest friend or family members — you — and anyone who share our love for Nature and her profoundly beautiful and ingenious living creations.

Starting in August 2019, we will post any unusual findings and observations on subjects of tropical nature in general, and of cloud forest in specific with readers of our blog www.serendips.net. The articles will be short and entertaining (we hope) and definitely informational.

Please visit our blog site and become a Serendipper at Nectandra, the realm of furry plants and mossy animals.

Windbreaker on La Gongolona Property

The planting season begins in June with the rains — an important part of the ecological restoration on properties acquired by the rural communities with our ecoloans. It is not by chance that Costa Ricans celebrate National Tree Day precisely on June 15th to coincide with the rain. Many in the communities, especially the school students, celebrate this day by reforesting the properties of the ASADAS (Spanish acronym for Rural Community Water Management Associations). However, planting trees is not the only undertaking in ecological restoration. On many occasions, efforts must also be made to improve site conditions, that is, to correct the climatic, soil and ecological imbalances of a site.

This is the case with La Gongolona property, which was acquired through an eco-loan in August 2018 by FEDAPRO (a federation of 13 ASADAS). The 20 ha property, located in a mountainous area within the Chayote Protective Zone, is devoid of vegetation and exposed to extremely strong, tree damaging winds. That is why rows of the shrub *Elaeagnus umbellata* known locally as "Uvita" (grape in Spanish) were planted as windbreakers with this year's rains. While this plant is native to East Asia, it has naturalized in Costa Rica. Local farmers traditionally use this species as windbreaker to protect crops and pastures from the winds. It has the advantage that it can be propagated

Betsy Minkler and Roy Campos (ASADA Llano Bonito) transplanting uvita stakes

Isabel Amát and Pablo Ramírez (ASADA Guaruma) transplanting uvita stakes

from stakes and grow together in such a way that it forms a natural barrier against the wind. In addition, it produces a large amount of red fruits that cover all its branches from April to June. While perched on its branches, many birds feed on this important and abundant food source, and leave behind seeds of other tree species from nearby forests. In fact it is common to find seedlings along the rows of windbreaks as well as a large amount of litter and important organic matter that serves as a substrate for future trees. Fruits can also be consumed by humans and have a pleasant acid taste.

The work is not simple, since it is necessary for one person to transport the stakes through a steep terrain, distribute them along the terrain in a direction perpendicular to the direction of the wind, while another person goes behind planting them. On this June 2019 session, a total of 630 meters of windbreak lines were planted, in multiple rows, which in turn will delineate different plots for future reforestation.

These activities were made possible thanks to the collaboration of members of the ASADA of Llano Bonito and the ASADA Guarumal (both members of FEDAPRO). We also thank our volunteers Betsy Minkler (USA) and Isabel Amát Rodolfo (Spain) for their enthusiastic participation on this day, in spite of the first rain of 2019, which soaked the soil, the stakes and our clothes.

— reported by Manrique Esquivel Villalobos —

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Thank you for your collaboration

Huntleya burtii orchids at the Nectandra Cloud Forest Reserve

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