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The Potential of Pigeon Creek, San Salvador, Bahamas, as a Nursery Habitat for Juvenile Coral Reef Fish

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By

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THESIS DEFENSE

for

Ian Conboy

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Abstract

The government of the Bahamas is considering making parts of San Salvador a National Marine Park. This study was conducted to assess the significance of Pigeon Creek, a shallow tidal lagoon, as a nursery for coral reef fishes. The perimeter of Pigeon Creek is lined with mangrove and limestone bedrock. Depending on location in the Creek, the bottom is sand or seagrass and ranges in depth from shallow intertidal sand flats to deeper, tide-scoured channels with a maximum depth of 3 m. In June 2006 and January 2007, fish were counted and their reproductive status (juvenile or adult) was recorded by sampling a total of 112, 50-m transects along the perimeter of the lagoon. Excluding silversides (Atherinidae, 52% of the fish counted), of the remaining fish counted, six families each comprised >1% of the total abundance (parrotfishes, 35.3%; snappers, 23.9%; grunts, 21.0%; mojarras, 8.5%; damselfishes, 6.1%; wrasses, 2.4%). There were few differences in effort-adjusted counts among habitats (mangrove, bedrock, mixed), sections (North, Middle, Southwest) and seasons (summer 2006 and winter 2007). Snappers, grunts and parrotfishes are important food fishes and significant families in terms of reef ecology around San Salvador. Red Mangrove (*Rhizophora mangle*) which covered 68% of the perimeter of Pigeon Creek, and where 62% of the fish were counted, was an important habitat for snappers (Lutjanidae) and grunts (Haemulidae) but bedrock was the most important habitat for parrotfishes (Scaridae). The Southwest section of Pigeon Creek was important for snappers, grunts and parrotfishes, the North section for grunts and parrotfishes, and the Middle section for snappers. Only six juvenile Nassau grouper

were counted in perimeter habitats, but 32 were counted during 33 minutes of drift sampling in the channel of the Southwest section of Pigeon Creek. Among the non-silverside fish counted, 91.2% were juveniles. Although not part of this study, many juvenile Queen conch and juvenile Caribbean spiny lobster also were observed. These results suggest that Pigeon Creek is an important nursery for the coral reefs surrounding San Salvador, and should be protected from any disturbance caused by development or increased use of the area.

Biography

I was born and raised in the Philadelphia area until college. I graduated from the University of South Carolina with a B.S. in Marine Science and a focus on Marine Biology in 2005. Currently I reside in East Falmouth, MA on Cape Cod where I work for the Northeast Fisheries Observer Program as a Data Editor. I would like to pursue a career in fisheries science in the northeastern U.S.

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First and foremost I thank Dr. James Haynes for all of the time and effort he has put into this project. Without him I would have never finished. I also thank Dr. Donald Gerace, Dr. Kenny Buchan and my theses readers, Dr. Joseph Makarewicz and Dr. Jacques Rinchard, for their constructive criticisms. I thank my mother Sue and step-father Rich for being there through the entire graduate school process. They helped push me along and gave me the confidence to finish what I began. I also thank my father Steve and step-mother Kelly, sisters Jen & Samantha, and my brother Tyler for their support and their understanding that I could not always be there for the three years this has taken. I thank the Gerace Research Center for allowing us to stay at their beautiful research facility on San Salvador. They supplied us not only with rooms and food, but with supplies and transportation to and from Pigeon Creek every day. Last, and certainly not least, I thank Rick Smith for all his hard work in assisting me with this project. Rick withstood all of the conditions from the hot scorching sun, stings from jellyfish, and the bugs that made it into our room every night.

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Introduction

A coastal lagoon is a transitional area between land and sea, often an embayment separated from the coastal ocean by barrier islands. As the tidal current ebbs and floods, the physicochemical factors at a particular point will vary according to the characteristics of the water passing by at the time (Herke and Rogers 1999).

A habitat is a nursery if its contribution per unit area to the production of individuals that recruit to adult populations is greater, on average, than production from other habitats in which juveniles occur (Beck et al. 2001). Tropical and subtropical back reef habitats such as seagrass meadows, mangrove prop-roots, and channels bisecting mangrove islands serve as important nursery areas for many fish species, specifically those spawned offshore (Weinstein and Heck 1979; Stoner 1983; Sogard et al. 1987; Morton 1990; Eggleston 1995; Ley et al. 1999; Nagelkerken et al. 2000; Dahlgren and Eggleston 2001; Laegdsgaard and Johnson 2001, all cited in Eggleston et al. 2004). These habitats may intercept large numbers of larvae and provide abundant food sources and protection from predators (Parrish 1989; Dahlgren and Eggleston 2000; Laegdsgaard and Johnson 2001, all cited in Eggleston et al. 2004). Furthermore, temperate nursery areas for juvenile fishes are often associated with areas of heavy foliage analogous to seagrass beds in the tropics (Miller and Geibel 1973; Larson and DeMartini 1984; Carr 1989; Holbrook et al. 1989; Shulman 1985; Sale 1969; Jones and Chase 1975; Choat and Kingett 1982, all cited in Sale 1991). In temperate and tropical systems, juveniles often occur in shallow water then move to deeper water as they grow older (Sale 1991).

Project Rationale

The Bahamian government is considering declaring selected areas around San Salvador a National Marine Park, but work must be done to identify the most critical places for protection. Potential benefits of marine reserves are to (1) supply biomass of harvestable individuals via emigration to fished areas; (2) increase spawning-stock biomass, which may magnify recruitment; (3) restore natural size-frequency distributions of the protected populations, specifically to enhance larger size classes, which may affect sex ratios and reproductive output (Beck et al. 2001); (4) protect biodiversity; and (5) promote non-fishery economic benefits such as tourism. My project evaluated the potential role of Pigeon Creek as a nursery for coral reef fishes associated with the island of San Salvador in the Bahamas. The study had two foci: (1) to quantify fish in three types of habitat (mangrove, bedrock, mixed [mangrove and bedrock]) lining the perimeter of the three sections (North, Middle, Southwest) of the lagoon, and (2) to estimate the standing stock of species which comprised >1% of the fish counted.

Pigeon Creek

Pigeon Creek is a shallow, tidal lagoon at the southeastern end of San Salvador (Figures 1 and 2) with a variety of habitats potentially important for juvenile reef fish, including sand flats, seagrass beds, mangrove prop roots, tidal channels, and scattered hard substrates such as rock ledges, small reefs, harvested conch shell middens, etc.). The study site has two distinct areas: an extensive tidal to shallow, subtidal flat and a tidal channel near the entrance to the lagoon (Welle et al. 2003). Pigeon Creek is expected to be an important nursery habitat for juvenile grouper, snapper and other reef fishes based on three factors. First, it is the major tidal mangrove habitat on the island containing seagrass beds, small coral heads, and rocky ledges (a much smaller area of red mangrove and adjacent seagrass habitat exists in Blackwood Bay of East French Bay; Gerace et al. 1998). Second, juvenile fish populations appear to be higher in Pigeon Creek than at any other area around the island (Krumhansl et al. 2007). Finally, the fishes in Pigeon Creek are similar (personal observations, Jan 2006) to those found in Fresh Creek (a confirmed nursery habitat) on Andros Island, Bahamas (Table 1) which also has habitats composed of seagrass beds, mangroves, and bedrock (Layman and Silliman 2002).

Reef Fish Life History

Of about 100 families of bony fishes associated with coral reefs, only four plus a single species of a fifth family lack a pelagic early life history stage (Sale 1991). Pelagic eggs and larvae have high natural mortality during this critical period (Sale 1970; Doherty 1981; Richards and Lindeman 1987; Doherty and Williams 1988; Leis 1991, all cited in Ramirez-Mella and Garcia-Sais 2003). Therefore, coral reef fishes are highly fecund (annual egg production ranges from 10,000 to one million per female, Sale 1980). Because there is no parental care, offspring are at the mercy of planktivorous predators, and density independent factors such as strong winds and currents play a large role in larval survival. Thus, recruitment of juvenile reef fishes to coastal environments is highly variable and high quality nursery areas are critical for future recruitment to adult stocks because they provide shelter from predation and excellent sources of food (Parrish 1989).

Reef fish typically spawn in one or more of three patterns: daily throughout most or all of the year, monthly in response to phases of the moon, or seasonally (probably in response to temperature). Daily spawning is done by both benthic and pelagic spawning reef fish. Some common reef families that practice daily spawning are wrasses (Labridae), parrotfishes (Scaridae), and sea basses (Serranidae). Johannes (1978) and Robertson (1983) (both cited by Sale 1991) proposed that tidal cycle (lunar influence) is the primary factor controlling the daily spawning periodicity of reef fishes. Pet et al. (2006) observed that spawning aggregations of many coral reef fishes form according to the lunar cycle; they also suggested that temperature (a seasonal cue) may influence the timing of spawning. Spawning aggregations often occur during a new or full moon. For example, Nassau groupers form spawning aggregations during the full moon in December and January (Bolden 2004). Other families that spawn following lunar cycles are damselfishes (Pomacentridae) and blennies (Blenniidae). Spawning patterns among the members of a single reef fish population may range from situations in which an entire local population spawns synchronously once a year (unimodal), in bimodal seasonal cycles that vary in strength and timing, or in apparently non-seasonal, year-round activity (Robertson 1983, as cited by Sale 1991).

Spawning occurs when a group or pair rushes to the surface, releases gametes into the water column and quickly returns to the group below. To protect their newly released gametes and larvae, reef fish may spawn during the beginning of an ebb tide away from their habitat. This limits predation by fishes living where reef fish spawn (Colin 1996). Johannes (1978), Thresher (1984), and Gladstone and Westoby (1988) (all cited in Sale 1991) proposed that successful dispersal of planktonic eggs or larvae is affected by tidal heights and flows or moonlight levels, or that synchronization of spawning is intrinsically advantageous because of predator oversaturation.

Some coral reef fishes migrate up to hundreds of kilometers to form spawning aggregations, including members of families Lutjanidae (snappers), Serranidae (sea basses), Scaridae (parrotfishes), and Acanthuridae (surgeonfishes) (Russell 2001). Aggregations facilitate easy male-female interactions and a current direction that will carry developing eggs and larvae toward nursery areas. Spawning aggregations have been known for some time, and commercial fishing overexploits the high density of economically valuable fish (C. McKinney, Bahamas Reef Environmental Education Foundation, Nassau, pers. comm.).

Otolith-based research indicates that the duration of the pelagic phase is species-dependent and ranges from 9-100 days (Brothers and Thresher 1985). Inconspicuousness promotes survival, so reef fish larvae are usually small and transparent. Most larvae look nothing like their adult form, but before settlement to benthic existences they metamorphose into miniature versions of their parents.

Reef fish larvae are found hundreds of kilometers from the nearest reef (Leis 1983). Early in planktonic life, they have little control over directions of movement. As they grow and are able to control their movements more, they may engage in horizontal movements or vertical diel migrations (Leis 1991). The larvae of many species settle directly on reefs, while others end up in tidal lagoons and estuaries similar to Pigeon Creek. Their developing senses apparently are used to find an area for settling. How an area is chosen is unknown, but there are several theories, including olfactory and auditory perception of suitable nursery habitat.

Ecological evidence suggests that passive dispersal alone often cannot explain larval reef fish distributions, suggesting active behavior by larvae (Montgomery et al. 2001). Potential cues include chemoreception/olfaction, waves and visual location of reefs (Montgomery et al. 2001). Milius (2005) presented a new theory about how young fish are attracted to tidal estuaries similar to Pigeon Creek: noise generated from inside the creek by other fish may be attracting the young. Researchers have tested this idea by playing recordings of noise generated by shrimp and fish from an artificial reef at Australia's Lizard Island. One family, cardinalfish, preferred the artificial reef from which sounds were broadcast

Larvae settle into locations like Pigeon Creek for several reasons. Lagoons containing mangroves and seagrass beds are ideal nurseries for the juveniles of coral reef species because of the high abundance of food and shelter and reduced predation pressure (Parrish 1989, Laegdsgaard and Johnson 2001, Nagelkerken et al. 2001). Studies such as the ones just mentioned, along with Layman and Silliman (2002) at

Andros Island in the Bahamas, many of Ivan Nagelkerken's studies conducted at Curaçao and Bonaire in the Caribbean, and previous research in Pigeon Creek by Buchan (2005), all focused on the potential of mangrove and seagrass beds as nursery habitats along with why larvae settle and juveniles depend on this type of ecosystem. .

Hypotheses

With knowledge from previous studies certain hypotheses can be made. First, Pigeon Creek is an important nursery area for juvenile coral reef fish at San Salvador because it contains large expanses of habitats known to be important for juvenile reef fishes elsewhere. Second, the mangrove habitat within Pigeon Creek contains more juveniles than the other two types of habitat: bedrock and mixed. Mangrove is likely the most suitable habitat for juvenile fish survival because of the root structure which can be used as protection from predatory fish and may supply food in the form of epiphytic algae and invertebrates. Third, observed fish density in mangrove habitat is highest during low tide when low water levels force fish under the mangrove root system where the deepest water is located.

Methods

Initial quick, wide-ranging, qualitative surveys were done within ± 3 h of peak low tide by canoe and snorkeling in June 2006. It was assumed that during low tide fish would be forced to move from very shallow or exposed seagrass beds and sand flats to the deepest water available along the perimeter of Pigeon Creek, and that this would permit accurate population estimates with reasonable sampling effort. GPS waypoints (330) were recorded every 50 m along the 9.9 km perimeter of the tidal lagoon where water was present within ± 3 h of low tide.

Pigeon Creek has three distinct sections separated by narrowing of the channel: North (31.2% of waypoints sampled), Middle (30.6%), and Southwest (38.2%), and three distinct habitats at a 50-m scale: mangrove (68.5% of waypoints sampled), bedrock (15.1%) and mixed (mangrove and bedrock, 16.4%). After the initial surveys, a stratified random sample of waypoints was surveyed quantitatively, with greatest sampling effort in the Southwest section and in mangrove habitat in both June 2006 and January 2007. I did not sample in seagrass beds or sand flats in Pigeon Creek, or include them in the experimental design, because of the rationale presented above and my preliminary observations that few fish, juveniles or adults, occupied these habitats compared to the mangrove and bedrock habitats.

To sample, a 50-m transect line was deployed by canoe parallel to and far enough away from the sample site so as not to disturb the fish. Once the transect line was in place, two people positioned themselves at the ends of the transect line (0 m and 50 m). Ten to 20 min (empirically determined during qualitative surveys, but usually 12 min) was spent identifying and counting (or estimating in the case of large schools, e.g., silversides) fish every 10 m along the transect line (0, 10, 20, 30, 40 and 50-m marks). A 2-m PVC pipe laid parallel to the transect line was used to define the field of observation at each 10-m mark. Counts were adjusted for count per unit effort (CPUE = [number of fish in each taxon observed per 50-m transect]/[total minutes of observation time per 50-m transect]*60 min = estimated count per hour) and log-transformed (log [CPUE+1]) for statistical analysis. Separate timed, drift surveys using SCUBA were conducted near the mouth of Pigeon Creek where juvenile Nassau grouper had been reported (Krumhansl et al. 2007).

Each fish observed was placed in a reproductive class in one of two ways. Nassau grouper >25 cm total length (TL) were considered early or mature adults while Nassau grouper <25 cm were considered juveniles (Krumhansl 2007). Gray snapper >25 cm also were considered adults, based on the relationship between their common maximum length and that fact that 40-50% of their maximum length is when they are considered sexually mature (Carpenter 2002). Other taxa were characterized as juvenile or adult by distinct coloration and markings (Humann 1996).

Three environmental parameters were recorded while conducting population counts. The period of tide (tide quarter: ±3 h peak low tide, next 6 h, ±3 h peak high tide, next 6 h), according to tide charts, was recorded for each sampling transect. Cloud cover (<33%, 33-66%, >66%) and visibility, or distance seen when conducting population counts (<3m, 3-6m, >6m), were estimated visually at each waypoint sampled. No environmental parameters were recorded during grouper surveys.

Sampling data were used to estimate juvenile reef fish standing stock by habitat and section of Pigeon Creek, and to assess the potential magnitude of Pigeon Creek as reef fish nursery habitat. The standing stock of each taxon >1% of the non-silverside fish count was estimated for each habitat (mangrove, bedrock, mixed) and section (North, Middle, Southwest) by the following procedure: CPUE per 50-m sampling transect in each habitat and section was divided by five (to reflect actual fish counts during the mostly 12-min sampling times per 50-m transect; 60 min/12 min = 5) and multiplied by 50/12 (to reflect that fish were only counted at six, 2 m-wide locations along each 50-m transect). After estimating the average number of each taxon per transect in a habitat or section of Pigeon Creek (e.g., schoolmaster in mangrove habitat, gray snapper in the Middle section), the averages were multiplied by the number of 50-m sampling sites in each category to estimate the standing stock of each taxon in that category. Values for the three habitat or three section categories were summed to estimate total standing stocks for Pigeon Creek.

In a similar study, Eggelston et al. (2004) compared the mean density of reef fishes in seagrass, mangrove, channel, and patch reef habitats with t-tests. They did not use ANOVA because it would include habitat as a factor and they were unsure of the accuracy of their habitat classifications. By precisely defining the habitat of each sampled transect, this problem was avoided in my study. Multivariate ANOVA (General Linear Models with cloud cover, visibility and part of tidal cycle as covariates) was used to test hypotheses on differences in fish counts re: habitat (mangrove, bedrock, mixed), section of Pigeon Creek (North, Middle, Southwest) and season (June, January). Tukey's HSD tests were used to differentiate among means using experiment-wise error rates. One-way ANOVA was used to distinguish means when a GLM indicated that a covariate was significant.

Results and Discussion

This study had two foci. 1) Determine if Pigeon Creek is an important nursery habitat for juvenile coral reef fishes by counting fish in three habitats (mangrove, bedrock, mixed) lining the perimeter of the three sections (North, Middle, Southwest) of the Creek. 2) Estimate standing stocks of species >1% of non-silverside fish counts. Additional questions were posed. 1) Is mangrove more suitable than other habitats for juvenile fish in Pigeon Creek? 2) Are the numbers of fish observed inversely proportional to visibility while sampling? 3) Are fish counts highest at low tide when low water levels restrict them mostly to the mangrove root system?

Fish Counts

During the two sampling seasons, 19 families, 23 species, and 19,297 fish were counted at 58 sites in June 2006 and 54 sites in January 2007 (Table 2); most sites (51) were sampled in both seasons. Silversides (Atherinidae) were 52% of the fish counted, and they are excluded from the analyses that follow because they are not found on San Salvador's patch reefs and, technically, are not reef fish. However, given their abundance, silversides are likely important prey, particularly for snappers and grunts in Pigeon Creek. Among the seven non-silverside taxa >1% total fish abundance (parrotfishes, Scaridae, 35.3%; grunts, Haemulidae, 21.0%; snappers, Lutjanidae: schoolmaster, *Lutjanus apodus*, 19.1% and gray, *L. griseus*, 4.8%; mojarras, Gerridae, 8.5%; damselfishes, Pomacentridae, 6.1%; wrasses, Labridae, 2.4%), four are potentially important food fishes for the people of San Salvador (snappers: schoolmaster and gray, grunts, parrotfishes). The predominant taxon in June 2006 (64% of the non-silverside count) was parrotfishes (43%; Figure 3). In January 2007 (36% of the non-silverside count), the predominant taxa (Figure 4) were schoolmaster (28%), grunts (23%) and parrotfishes (22%). Based on reproductive status observed across both sampling seasons 91.2% of the fish were juveniles.

In a similar study looking at the importance of red mangrove to juvenile fishes in Pigeon Creek, Buchan (2005) observed nine non-silverside taxa >1% of total abundance (parrotfishes, 29.2%; snappers, 27.8 %; grunts, 18.0%; mojarras, 14.7%; damselfishes, 3.2%; barracuda, 1.5%; wrasses, 1.3%; puffers, 1.2%; goatfish, 1.1%), of which approximately 90% were juveniles. Six of Buchan's nine taxa >1% non-silverside count were among my seven taxa >1%, and the eighth most common fish in my study was the checkered puffer at 0.7%. Krumhansl et al. (2007) also reported that mangrove roots and seagrass beds in Pigeon Creek are habitat for diverse juvenile reef fish species. Adult parrotfishes, snappers and grunts are common on San Salvador's patch reefs, suggesting that recruitment from Pigeon Creek is needed to maintain these taxa in the local reef fish communities.

Influences of Habitat, Section and Season on Fish Counts (Tables 3-9)

There were no significant main effects (habitat, section, season) or interactions of main effects for parrotfishes (Table 7) and schoolmaster (Table 8).

Habitats—. Wrasses had significantly higher CPUE in bedrock than in mangrove (P = 0.022; Table 3), but they were always seen along the edge of the mangrove. Damselfishes had significantly higher CPUE in bedrock and mixed habitats than in mangrove ($P = 0.017$; Table 4). Due to their small sizes, damselfishes can utilize the spaces in pock-marked bedrock as protection from larger predators. The beaugregory (*Stegastes leucostictus*) and bicolor damselfish (*Stegastes partitus*) are brightly colored, do not exhibit protective schooling (safety in numbers), and may require shelter in bedrock for protection. Also, damselfishes may be attracted to the bedrock and mixed habitats due to the food present; e.g., the beaugregory relies on ostracods in these habitats for food (Nagelkerken and van der Velde 2004).

Many studies have documented the importance of estuaries and lagoons as reef fish nursery habitat in the Caribbean region (Arrivillaga and Baltz 1999; Robblee and Zieman 1984; Stoner 1986; Rooker and Dennis 1991; Sedberry and Carter 1993, all cited in Layman and Silliman 2002). Mangrove prop roots, seagrass beds and rocky substrate provide shelter for the future adult reef fish. For example, Nagelkerken et al. (2001) compared bays with and without mangrove/seagrass habitats on a single island; juveniles of the 17 species studied were abundant in the mangrove/seagrass-dominated bays but largely absent in bays lacking these habitats.

It is generally accepted that mangrove functions as nursery habitat for juveniles of many reef fishes and invertebrates that eventually recruit to nearby coral reef populations (Parrish 1989; Nagelkerken et al. 2000; Beck et al. 2001; Layman and Silliman 2002; Chittaro et al. 2004). However, there were few differences in fish counts (as CPUE) among habitats in my study. Mangrove habitat comprised 68% of the fish habitat along the perimeter of Pigeon Creek, and the greatest number of fish was counted in mangrove (62%). Therefore, mangrove is important as nursery habitat in Pigeon Creek because of its great abundance, not because it holds more fish per 50 m of perimeter than other habitats.

According to Buchan (2005), shade is the most important factor attracting fish to red mangrove habitat, followed by habitat complexity. He suggested that the mangrove prop root system in Pigeon Creek was utilized by juveniles because it provides the complex structure and shade necessary for protection from predators and sun while supplying food in the form of epiphytic algae and invertebrates (see also Gratwicke et al. 2006). The abundance of juvenile parrotfish (macroalgae feeders) and snappers and grunts (invertebrate feeders) amongst the mangrove prop roots suggests that this habitat is of particular importance to these abundant families. For example, schoolmaster and gray snapper move and rest in large schools in mangrove habitat (Buchan 2005). Cocheret de la Moriniere et al. (2003) showed that grunts exposed to artificial mangrove units (AMUs) were attracted to more structurally complex and shaded habitats. More evidence for the importance of mangrove prop root habitat for some reef fishes comes from a study by Nagelkerken and van der Velde (2004) at the Caribbean island of Curacao where the diet of the smallmouth grunt (*Haemulon chrysargyreum*) was primarily Tanaidacea (tiny crustaceans) that live in mangrove habitat but not seagrass beds.

Sections—. Wrasses (Table 3), damselfishes (Table 4), mojarras (Table 5) and gray snapper (Table 6) had significantly different CPUE among sections in Pigeon Creek. Wrasses (P = 0.005) and damselfishes (P = 0.017) were more abundant in the

Southwest and Middle sections than in the North section. Mojarras were more abundant in the North section than in the Middle and Southwest sections ($P = 0.010$), while gray snapper were more abundant in the Middle section than in the North and Southwest sections ($P = 0.031$). Buchan (2005) observed mojarras in greater abundance at sites with less benthic vegetation, such as the North section, where their silver color provides camouflage in open water over sand. Among sections, the Southwest (36% of the Pigeon Creek's wetted perimeter within ± 3 h of low tide) had the highest fish counts (46% as CPUE).

Mangrove along the perimeter of the Southwest section of Pigeon Creek is bordered by turtle (*Thalassia testudineum*) and manatee (*Syringodium filiforme*) seagrasses, whereas mangrove in the Middle and North sections was more commonly bordered by sand. Although these differing habitat, section and species combinations point toward the Southwest section of Pigeon Creek as a focus for protection efforts, the fact that virtually nothing is known about potentially complex ecological interactions in the Pigeon Creek lagoon suggests that all of Pigeon Creek should be protected from development, dredging, etc., until there is a better understanding of the ecological dynamics of the lagoon system.

Seasons—. Wrasses (Table 3) were more abundant in January than in June ($P = 0.017$), and mojarras (Table 5) were more abundant in June than in January ($P = 0.049$). Wrasses are year-round spawners (Munro et al. 1973), so it is not clear why counts were higher in January. Mojarras <5 cm long were abundant in the mangrove habitat in June, suggesting that winter/spring is the primary spawning period (Munro et al. 1973).

Juvenile parrotfishes and grunts exceeded 20% of the fish counted in both June 2006 and January 2007, while schoolmaster exceeded 20% in January 2007; 64% of the fish in this study were counted in January. Parrotfishes spawn throughout the year with greatest activity during the summer months (Munro et al. 1973), grunts spawn from late fall to early spring (Munro et al. 1973), and schoolmasters spawn throughout the spring and summer (Munro et al. 1973). Given the lengthy spawning seasons and relatively long spans of juvenile life of parrotfishes and grunts, it was not surprising to find them equally abundant in June and January. Given the spring/summer spawning season of schoolmasters, it was not surprising to find more juveniles in the winter. CPUE was not significantly different between June and January for most taxa. It appears that Pigeon Creek is a year-round nursery for most taxa and is especially important for juvenile schoolmaster during the winter (Table 8).

Interactions—. Habitat-section interactions were significant but not interpretable for wrasses (Table 3, P = 0.015), mojarras (Table 5, P = 0.064, suggestion of significance), gray snapper (Table 6, P =0.052, suggestion of significance), and grunts (Table 9, P = 0.002). There was a suggestion of significance for the habitat-season interaction of gray snapper (Table 6, P = 0.084; Bedrock/ January > all other habitat-season combinations except Bedrock/June). The section-season interaction was significant for grunts (Table 9, P = 0.044; North section/June >

North/January). No other habitat-section-season interactions for taxa >1%.total fish counts were significant.

Influences of Environmental Conditions on Fish Counts

Water temperature was measured on only a few days but was constant at waypoints visited on the same days. The average temperature during June 2006 was 32.0°C while during January 2007 it was 25.9°C.

Environmental factors evaluated as covariates in relation to fish counts were tide quarter (TQ 1 = $\pm$3 h of peak low tide, TQ 2 = next 6 h, TQ 3 = $\pm$3 h of peak high tide, TQ 4 = next 6 h), percentage of cloud cover, and water visibility (m). No covariates were significant for mojarras (Table 5), gray snapper (Table 6), schoolmaster (Table 8), and grunts (Table 9).

Tide quarter—. In both seasons most counts (60.7%) were made $\pm$3 h around peak low tide. This served to concentrate fish in the deepest water along the perimeter of Pigeon Creek rather than have them spread across shallow or exposed seagrass beds and sand flats where they could not be counted easily. However, in the North section of Pigeon Creek during low tide some of the mangrove habitat was still submerged in $\geq$2 m of water, making it difficult to observe and count fish. For wrasses (Table 3), the results suggested that tide quarter was significant ($P = 0.067$); a separate one-way ANOVA indicated that CPUE was higher in tide quarters 2 and 4 than in tide quarters 1 and 3. This may have occurred because currents are greater in tide quarters 1 and 3 than in 2 and 4; therefore, wrasses may have been deeper in mangrove to avoid higher currents and harder to see. In sum, the hypothesis that CPUE would be higher near low tide was not supported by the data.

Cloud cover—. In June 2006 cloud cover was <33% during 54.5% of sampling days, but in January 2007 cloud cover was >66% during 43.6% of sampling days. This result was expected for summer (June) vs. winter (January) weather. For damselfishes counts (Table 4), cloud cover was significant (P = 0.010); a separate one-way ANOVA indicated that CPUE was higher when cloud cover was ≥34% than when it was <33%, suggesting that bright sunlight made them less likely to be within view of observers. Although it was anticipated that greater cloud cover would reduce visibility and fish counts, except for the reverse situation for damselfishes there were no differences in counts related to cloud cover.

Visibility—. Pluralities of observations were in the 0-3 m visibility range during June 2006 (43.6%) and January 2007 (43.1%). For parrotfishes (Table 7), the results suggested that visibility was significant (P = 0.051); a separate one-way ANOVA suggested that CPUE was higher when visibility <3 m than when it was ≥3 m. In sum, the hypothesis that decreased visibility (as indicated by greater cloud cover or more turbidity) would result in lower CPUE was not supported, and I have confidence in the comparability of fish counts across environmental conditions.

Nassau Grouper

Nassau grouper were only 0.03% of the total fish counted (N=6) during the 112 standard 50-m transect surveys conducted in both seasons (June 2006 and

January 2007). However, 36 juvenile Nassau grouper were counted during three, 10-min and one, 3-min timed swims in January 2007 (Table 10). During these surveys, 32 grouper were <25 cm, and 4 were >25 cm. Based on Krumhansl's (2007) size-based definition of an adult, only 4 of the 36 Nassau grouper counted were adults.

The Nassau grouper is an important Bahamian fish—socially, economically and ecologically (Sluka et al. 1997, Krumhansl et al. 2007). In particular, it plays an important ecological role in near shore habitats as a top predator, so the health of the Nassau grouper population is essential for maintaining the ecological health of the reef system. Healthy patch reefs are necessary to support San Salvador's artisanal Nassau grouper fishery, reef community structure, and tourism-dependent businesses.

Similar to observations by Krumhansl et al. (2007) at San Salvador and Layman and Silliman (2002) at Andros Island, Bahamas, the Nassau grouper in my study were observed at coral or conch shell middens, rocky overhangs, or tide scoured channels cut through seagrass habitat. The main channel of the Southwest section of Pigeon Creek may be considered a "waiting room" (Parrish 1989) for juvenile Nassau grouper before they make their ontogenetic shift to San Salvador's reefs. Pigeon Creek, particularly the channel of the Southwest section, likely supports the adult population of Nassau grouper at San Salvador (Eggleston et al. 1998, Krumhansl 2007). This area should be considered critical habitat and protected.

Estimated Standing Stocks of Fish in Pigeon Creek

Standing stocks were estimated for taxa >1% abundance in Pigeon Creek (Tables 11-13). Means and 95% confidence intervals (CI) calculated for ecologically important food fishes, snappers: gray and schoolmaster, grunts, and parrotfishes, are 19,812 (13,255-26,370), 19,130 (14,549-23,712), and 26,423 (93-52,754), respectively (Table 11). Because mangrove comprises the vast majority of habitat in Pigeon Creek (68%, 209/305 50-m transects along its wetted perimeter near low tide), standing stocks are highest in mangrove for all taxa considered in Table 12. In sum, tens of thousands of juvenile fish live in Pigeon Creek and are available to recruit to ecologically important adult populations on San Salvador's reefs.

Statistical Issues

Count data like those that form the core of this study are notoriously variable. However, substantial sample sizes (112 out of 305 possible to sample 50-m transects along the wetted perimeter of Pigeon Creek at low tide) and log (N+1)-transformations of count data gave coefficients of variation (CV = SEM [standard error of the mean]/Mean) of less than 20% in most cases (Tables 3-9), a reasonable value for count data. Given the variable numbers of observations by category (habitat: mangrove, bedrock, mixed; section: North, Middle, Southwest; season: June 2006, January 2007), it was not possible to calculate the power of each comparison directly, but low CV is a reasonable qualitative approximation of good statistical power (i.e., the probability of accepting a null hypothesis of no differences among treatment groups when it is false is low).

CVs were <20% for all treatment groups of five of the seven taxa >1% of the non-silverside count in this study (Tables 3-9). For wrasses in the North section of Pigeon Creek, the mean count was low and SEM was high (both due to many zero counts), so CV was high (36.8%, Table 3). For gray snapper (Table 6), four of the seven CV values ranged from 22.9-31.5%. Small sample sizes in bedrock (N=13) and mixed (N=20) habitats probably accounted for their relatively high SEMs and CVs > 20%. For section, mean counts were low and SEMs were high (both due to many zero counts) in the North and Southwest, so CVs were high in those sections. In sum, high CV values are explained by the structure of the data; it is unlikely that differences among groups within categories have been missed due to low statistical power.

Based on personal observations during low tide there were relatively few fish over seagrass beds and sandflats compared to deeper water under mangrove. Given the logistical difficulty for two people to sample a statistically valid number of transects over the entire area of Pigeon Creek, I chose to focus on deep water along the perimeter of the creek during the period ± 3 h of peak low tide. As mentioned above, this sampling design was based on the assumption that fish would move to deeper, shaded water at during the period of low tide rather than be exposed to intense sun in very shallow water. If this assumption was incorrect, then I may not have gotten unbiased counts.

Common to many field studies that count animals, I estimated standing stocks of fishes from extrapolations of 12 m of actual observations per 50-m transect to all of Pigeon Creek. Given extreme site to site variation in fish counts (see Appendix A) due to a variety of potential physical (e.g., currents, distance from the lagoon opening, habitat structure, distance to other habitats, etc.) and biological (e.g., degrees of fish site attachment re: movement, schooling, etc.) factors (see Buchan 2005), the potential for error exists. However, because of the large sample sizes in my study (transects and fish counts), my rapid assessment technique for estimating standing stocks was a reasonable approach.

One statistical misstep was made in this study—pseudo-replication across seasons (June 2006, January 2007). A stratified random sample (habitat, section) of transects was surveyed in June, but most of the same sections were surveyed again in January. A new stratified, random sample should have been collected in January. However, given the movements of fish observed while sampling and the 6-month gap between sampling periods, it is unlikely that many of the same fish were re-sampled; therefore, the sampling results for the two seasons are reasonably independent.

Conclusion

Is Pigeon Creek an Important Nursery Habitat for San Salvador?

For a tidal estuary on Andros Island, Bahamas, Layman and Silliman (2002) found that mangrove and seagrass habitats were dominated by grunts and snappers and had higher species diversity than sand flats. Consequently, they recommended preserving not only the mangrove habitat but also the adjacent seagrass beds. While my study did not sample seagrass beds specifically (Buchan 2005 did this), seagrass beds lay just offshore of many of the perimeter transects sampled, especially in the

Southwest section. The high abundance and diversity of juvenile reef fishes among the seagrass beds of Pigeon Creek reported by Buchan (2005), combined with my results for mangrove and bedrock habitats along the shore, suggest that Pigeon Creek has the characteristics of a productive nursery habitat for reef fishes.

Mangrove is assumed to function as a nursery for many reef fishes (Beck et al. 2001; Parrish 1989). Many of the most abundant fishes using mangrove in the Caribbean region also use other habitats during daily movements and ontogenetic shifts in their life histories (Pittman et al. 2007). For example, seascape structure immediately surrounding seagrass bed was influential in determining the densities of juvenile French grunts (*Haemulon flavolineatum*) and gray snapper (Pittman et al. 2007). Three studies (Bouillon et al. 2002; Dahlgren and Mar 2004; Huxham et al. 2004, all cited by Krumhansl et al. 2007) suggest that mangrove and seagrass habitats are high quality nursery areas because of high levels of primary and secondary productivity and because refuges are provided by mangrove prop roots and seagrass blades. A habitat is a nursery if its contribution per unit area of recruits to adult populations is greater, on average, than production from other habitats in which juveniles occur (Beck et al. 2001). Excluding silversides, 91.2% of the fish counted in my study were juveniles. With so many juvenile fish compared to the other marine habitats near San Salvador (patch reef, sand flat, grass/algae flat, hard ground; personal observation), Pigeon Creek is certainly the most important nursery habitat at San Salvador, especially since so few adults were observed during my study.

Cocheret de la Moriniere et al. (2002) conducted a study at Curacao, Netherlands Antilles on post-settlement life cycle migration (PCLM) patterns that compared the spatial distribution of prevalent taxa in a bay and adjacent fringe reef. Of the nine species studied, grunts, parrotfishes, snappers (the most abundant species in my study) all had spatial distributions in which the smallest individuals were only found in the bay and the largest individuals were only found on the adjacent reef. These results suggested a PLCM pattern over a considerable distance, in which juveniles settle and grow in alternative habitats such as seagrass beds and mangroves, after which sub-adults migrate to reef habitats where they become sexually mature (Cocheret de la Moriniere et al. 2002). The same spatial distribution of size classes also occurs between Pigeon Creek and the patch reefs around San Salvador.

Krumhansl et al. (2007) concluded after their study of "mangrove lagoon-seagrass complex" in Pigeon Creek that Nassau grouper and juvenile Queen conch (*Strombas gigas*) use Pigeon Creek as nursery habitat, in particular the area closest to the mouth (the lower Middle section in my study). They also observed a mean of 5.5 juvenile Caribbean spiny lobster (*Panulirus argos*) per hectare and many juvenile reef fishes in mangrove roots and seagrass beds in this area of Pigeon Creek. These findings, combined with those of Buchan (2005) and mine, indicate that Pigeon Creek is a vital nursery habitat not only for reef fish but also for economically and culturally important Queen conch and Caribbean spiny lobster.

Which habitats and sections of Pigeon Creek are most important for the three major groups of commercially important fishes (Table 11)? For snappers, standing stock was much higher in mangrove and bedrock than in mixed habitat and higher in the Middle and Southwest sections than in the North section. For grunts, standing stock in mangrove and bedrock was much higher than in mixed habitat and higher in the Southwest and North sections than in the Middle section. For parrotfishes, standing stock over bedrock was much higher than in mangrove and mixed habitat and much higher in the Southwest section than in the North section which was much higher than in the Middle section. Therefore, mangrove and bedrock habitats are both important (mixed habitat is simply a combination of the two) and the importance of a section re: protection depends on the taxon of interest.

Given the large area of Pigeon Creek (and little similar habitat elsewhere on San Salvador) relative to the small littoral shelf surrounding the island, it appears that Pigeon Creek is a major source of recruitment to San Salvador's reef fish community. Patch reef fishes are important to the artisanal fishery and for tourism at San Salvador. Therefore, any damage to the Pigeon Creek ecosystem and its biological productivity will adversely affect patch reef ecology and the local economy.

Management Recommendations

The major purpose of my study was to assess the importance of including all or parts of Pigeon Creek in the National Marine Park proposed for San Salvador, especially in light of proposed new residential development along Pigeon Creek (Hartnell 2007). From the results presented above, mangrove and bedrock habitats both certainly require preservation and protection if the nursery and recruitment potential of Pigeon Creek is to be maintained in the future. Which section(s) require protection depends on the taxon of interest. However, it would be unwise to protect just selected habitats or sections. The entire Pigeon Creek ecosystem is linked physically but we do not know enough about it yet to say that some parts can be changed without adversely affecting the ecological functioning of other parts that we know are important now.

Based on the results of this and similar studies, I recommend:

1. It may be possible to have minor development around parts of the lagoon in conjunction with mitigation measures to limit damage. Nowhere in the lagoon should be dredged to allow increased boat traffic as this could alter sediment dynamics and potentially smother important seagrass habitat. Fishing in the lagoon should be limited to avoid diminishing recruitment to nearby patch reefs. Inappropriate use of watercraft should be controlled to prevent erosion and sedimentation of seagrass beds. Sewage from any development should be treated to high standards. Because the area around Pigeon Creek provides important habitat for birds, land clearing should be minimized.
2. The main channel of the Southwest section, the mouth of Pigeon Creek, and Snow Bay (Krumhansl et al., 2007) may be considered a "waiting room" (Parrish 1989) for juvenile Nassau grouper, Queen conch and Caribbean spiny lobster before they make their ontogenetic shift to San Salvador's patch reefs. These areas are critical habitats and must be protected to ensure recruitment.

3. Studies like this one and those of Buchan (2005) and Krumhansl et al. (2007) should be repeated at regular intervals in the future to monitor the ecological health of the key habitats and sections in Pigeon Creek and to conduct population surveys to establish any changes in abundance of the important juvenile fishes (Nassau grouper, snappers, parrotfishes, grunts) and invertebrates (Queen conch and Caribbean spiny lobster).

Future Research

1. Examine otolith microchemistry to determine from which habitats and sections in Pigeon Creek fish are recruiting to San Salvador's reefs and shelf.
2. Conduct mark-recapture and genetic studies to conclusively establish relationships between fish populations in Pigeon Creek and those on the surrounding shelf of San Salvador.
3. Study the seasonality and magnitude of movements of larval fishes (e.g., Nassau grouper) and invertebrates (e.g., queen conch, Caribbean spiny lobster) into Pigeon Creek.
4. Study the seasonality and magnitude of movements of juvenile fishes and invertebrates out of Pigeon Creek into habitats on the shelf at San Salvador.

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Table 1. Juvenile reef fishes in Fresh Creek, Andros Island, Bahamas reported by Layman and Silliman (2002).

Common Name	Latin Name / Family	Habitat	RAC
Bonefish	*Albula vulpes*	S	C
Silversides	*Atherinomorus stipes*	M/S/R	A
Houndfish	*Tylosurus crocodilus*	S	C
Bar Jack	*Carangoides rubber*	M/S/G	C
Foureye Butterflyfish	*Chaetodon capistratus*	M	R
Sardine	Clupeidae	M/S/G	A
Herring	Clupeidae	M/S/G	A
Slender Mojarra	*Eucinostomus jonesii*	S	A
Mottled Mojarra	*Eucinostomus lefroyi*	S	A
Yellowfin Mojarra	*Gerres cinereus*	S	A
French Grunt	*Haemulon flavolineatum*	M/G	C
Sailor's Choice	*Haemulon parra*	M/G	A
Bluestriped Grunt	*Haemulon sciurus*	M/G/R	A
Slippery Dick	*Halichoeres bivittatus*	M/G	C
Hogfish	*Lachnolaimus maximus*	M	R
Bluehead	*Thalassoma bifasciatum*	M/G	C
Mutton Snapper	*Lutjanus analis*	M/R	C
Schoolmaster	*Lutjanus apodus*	M/R/G	A
Yellowtail Snapper	*Ocyurus chrysurus*	M/G	C
Cubera Snapper	*Lutjanus cyanopterus*	M/R/G	C
Gray Snapper	*Lutjanus griseus*	M/G	A
Lane Snapper	*Lutjanus synagris*	M/R/G	C
Blue Angelfish	*Holacanthus bermudensis*	N/A	R
French Angelfish	*Pomacanthus paru*	R	R
Sergeant Major	*Abudefduf saxatilis*	M/R/S/G	C
Beaugregory	*Stegastes leucostictus*	M/R	C
Cocoa Damselfish	*Stegastes variabilis*	M/R	C
Bluelip Parrotfish	*Cryptotomus roseus*	M	R
Emerald Parrotfish	*Nicholsina usta usta*	M	R
Rainbow Parrotfish	*Scarus guacamaia*	M	C
Redtail Parrotfish	*Sparisoma chrysopterum*	M	C
Bucktooth Parrotfish	*Sparisoma radians*	M/S	R
Redfin Parrotfish	*Sparisoma rubripinne*	M	R
Nassau Grouper	*Epinephelus striatus*	M	R
Black Grouper	*Epinephelus mystacinus*	M	R
Great Barracuda	*Sphyraena barracuda*	M/S/G	C
Sharpnose Puffer	*Canthigaster rostrata*	M/G/R	C
Checkered Puffer	*Sphoeroides testudineus*	M/R/S/G	C

Habitat Codes

S = Sand flat
M = Mangrove
R = Rocky
G = Seagrass

Relative Abundance Codes (RAC)

R = Rare (<10)
C = Common (10-1000)
A = Abundant (>1000)

Table 2. Fish counts (>1% of non-silversides) by habitat, section, and season.

	Habitat			Section			Season	
Species/Family	**Mangrove**	**Bedrock**	**Mixed**	**North**	**Middle**	**Southwest**	**June**	**January**
Wrasses	88	41	91	12	81	127	133	87
Mojarras	530	142	99	568	159	44	231	540
Damselfish	278	109	167	125	206	223	272	282
Parrotfish	1413	380	1415	401	543	2264	688	2520
Gray Snapper	325	42	69	142	224	70	237	199
Grunts	1432	181	293	942	426	538	715	1191
Schoolmaster	1333	152	233	334	625	759	896	822
Other Fish < 1%	201	16	28	43	75	127	84	168

Table 3. Count per unit effort of wrasses (Labridae) in relation to habitat and section of Pigeon Creek, season and environmental conditions (tide quarter, cloud cover, visibility). CV = Mean (log CPUE)/SEM (log CPUE).

Factors		**N**	**Mean**	**SEM**	**P-value**	**Result**	**CV**
Habitat	Mangrove	79	6.48	1.77			13.7%
	Bedrock	13	24.15	4.44			14.8%
	Mixed	20	16.96	3.51	***0.022***	***Bedrock > Mangrove***	18.2%
Section	North	41	3.31	2.67			**36.8%**
	Middle	32	20.72	2.94			11.8%
	Southwest	39	23.56	2.60	***0.005***	***Southwest, Middle > North***	8.7%
Season	June	58	12.24	2.10			13.6%
	January	54	19.49	2.18	***0.017***	***January > June***	8.4%
Interactions							
Habitat*Section					***0.015***	***Not interpretable***	
Habitat*Season					0.402	Not significant	
Section*Season					0.723	Not significant	
Covariates							
Tide Quarter					*0.067*	*TQ 2, 4 > TQ 1, 3*	
Cloud Cover					0.334	Not significant	
Visibility					0.140	Not significant	

Table 4. Count per unit effort of damselfishes (Pomacentridae) in relation to habitat and section of Pigeon Creek, season and environmental conditions (tide quarter, cloud cover, visibility). CV = Mean (log CPUE)/SEM (log CPUE).

Factors		**N**	**Mean**	**SEM**	**P-value**	**Result**	**CV**
Habitat	Mangrove	79	20.84	2.76			8.2%
	Bedrock	13	41.38	6.93			12.7%
	Mixed	20	34.75	5.49	***0.017***	***Bedrock, Mixed > Mangrove***	11.1%
Section	North	41	21.96	4.16			13.0%
	Middle	32	41.15	4.59			8.2%
	Southwest	39	33.87	4.06	***0.017***	***Middle, Southwest > North***	8.1%
Season	June	58	33.58	3.28			7.2%
	January	54	31.08	3.40	0.889	Not significant	7.3%
Interactions							
Habitat*Section					0.384	Not significant	
Habitat*Season					0.389	Not significant	
Section*Season					0.482	Not significant	
Covariates							
Tide Quarter					0.343	Not significant	
Cloud Cover					***0.010***	***>66%, 33-66% > <33%***	
Visibility					0.115	Not significant	

Table 5. Count per unit effort of mojarras (Gerridae) in relation to habitat and section of Pigeon Creek, season and environmental conditions (tide quarter, cloud cover, visibility). CV = Mean (log CPUE)/SEM (log CPUE).

Factors		**N**	**Mean**	**SEM**	**P-value**	**Result**	**CV**
Habitat	Mangrove	79	37.87	6.56			8.3%
	Bedrock	13	36.96	16.47			18.9%
	Mixed	20	38.29	13.04	0.922	Not significant	15.7%
Section	North	41	66.08	9.89			8.2%
	Middle	32	24.11	10.91			17.0%
	Southwest	39	22.92	9.66	***0.010***	***North > Middle, Southwest***	15.0%
Season	June	58	55.71	7.79			7.9%
	January	54	19.70	8.09	***0.049***	***June > January***	12.1%
Interactions							
Habitat*Section					*0.064*	*Not interpretable*	
Habitat*Season					0.531	Not significant	
Section*Season					0.787	Not significant	
Covariates							
Tide Quarter					0.168	Not significant	
Cloud Cover					0.931	Not significant	
Visibility					0.654	Not significant	

Table 6. Count per unit effort of gray snapper (*Lutjanus griseus*) in relation to habitat and section of Pigeon Creek, season and environmental conditions (tide quarter, cloud cover, visibility). CV = Mean (log CPUE)/SEM (log CPUE).

Factors		**N**	**Mean**	**SEM**	**P-value**	**Result**	**CV**
Habitat	Mangrove	79	17.64	3.49			13.2%
	Bedrock	13	18.27	8.76			**22.9%**
	Mixed	20	23.04	6.93	0.545	Not significant	**31.5%**
Section	North	41	7.10	5.26			**29.5%**
	Middle	32	46.74	5.80			12.3%
	Southwest	39	5.11	5.14	***0.031***	***Middle > North, Southwest***	**23.6%**
Season	June	58	7.27	4.14			18.2%
	January	54	33.03	4.30	0.153	Not significant	12.3%
Interactions							
Habitat*Section					*0.052*	*Not interpretable*	
Habitat*Season					*0.084*	*Bedrock/January >all but Bedrock/June*	
Section*Season					0.190	Not significant	
Covariates							
Tide Quarter					0.918	Not significant	
Cloud Cover					0.550	Not significant	
Visibility					0.327	Not significant	

Table 7. Count per unit effort of parrotfishes (Scaridae) in relation to habitat and section of Pigeon Creek, season and environmental conditions (tide quarter, cloud cover, visibility). CV = Mean (log CPUE)/SEM (log CPUE).

Factors		**N**	**Mean**	**SEM**	**P-value**	**Result**	**CV**
Habitat	Mangrove	79	110.66	66.45			7.7%
	Bedrock	13	213.22	166.67			13.3%
	Mixed	20	266.31	131.97	0.127	Not significant	11.6%
Section	North	41	173.99	100.09			12.1%
	Middle	32	44.07	110.43			9.3%
	Southwest	39	372.12	97.77	0.111	Not significant	7.9%
Season	June	58	292.64	78.87			7.6%
	January	54	100.81	81.89	0.578	Not significant	7.2%
Interactions							
Habitat*Section					0.207	Not significant	
Habitat*Season					0.137	Not significant	
Section*Season					0.254	Not significant	
Covariates							
Tide Quarter					0.483	Not significant	
Cloud Cover					0.361	Not significant	
Visibility					*0.051*	*<3 m < 3-6 m, >6 m*	

Table 8. Count per unit effort of schoolmaster (*Lutjanus apodus*) in relation to habitat and section of Pigeon Creek, season and environmental conditions (tide quarter, cloud cover, visibility). CV = Mean (log CPUE)/SEM (log CPUE).

Factors		**N**	**Mean**	**SEM**	**P-value**	**Result**	**CV**
Habitat	Mangrove	79	92.45	13.06			3.7%
	Bedrock	13	73.34	32.75			8.9%
	Mixed	20	46.96	25.93	0.961	Not significant	7.3%
Section	North	41	60.29	19.67			5.8%
	Middle	32	71.54	21.70			6.0%
	Southwest	39	80.92	19.21	0.724	Not significant	5.1%
Season	June	58	49.70	15.50			4.4%
	January	54	92.14	16.09	0.511	Not significant	4.4%
Interactions							
Habitat*Section					0.822	Not significant	
Habitat*Season					*0.058*	Not significant by Tukey's test	
Section*Season					0.903	Not significant	
Covariates							
Tide Quarter					0.163	Not significant	
Cloud Cover					0.692	Not significant	
Visibility					0.299	Not significant	

Table 9. Count per unit effort of grunts (Haemulidae) in relation to habitat and section of Pigeon Creek, season and environmental conditions (tide quarter, cloud cover, visibility). CV = Mean (log CPUE)/SEM (log CPUE).

Factors		**N**	**Mean**	**SEM**	**P-value**	**Result**	**CV**
Habitat	Mangrove	79	101.18	11.56			4.8%
	Bedrock	13	109.83	29.01			11.3%
	Mixed	20	72.90	22.97	0.459	Not significant	11.0%
Section	North	41	121.02	17.42			7.6%
	Middle	32	62.34	19.22			8.8%
	Southwest	39	100.55	17.02	0.685	Not significant	6.5%
Season	June	58	106.28	13.73			5.3%
	January	54	82.99	14.25	0.107	Not significant	6.7%
Interactions							
Habitat*Section					***0.002***	***Not interpretable***	
Habitat*Season					*0.069*	Not significant by Tukey's test	
Section*Season					***0.044***	***North/June > North/January***	
Covariates							
Tide Quarter					0.608	Not significant	
Cloud Cover					0.141	Not significant	
Visibility					0.383	Not significant	

Table 10. Nassau grouper survey count conducted in the channel between the Middle and Southwest sections of Pigeon Creek.

Survey Time (min)	Survey #	Count < 15cm	15-25 cm	> 25cm
10	1	0	2	0
10	2	10	6	2
3	3	5	7	2
10	4	0	2	0

Table 11. Standing stock estimates for snappers, grunts and parrotfishes by habitat (209 mangrove, 26 bedrock, 50 mixed) and section (112 North, 83 Middle, 110 Southwest) in Pigeon Creek. Numbers in parentheses above are the number of 50-m sections on the wetted perimeter of Pigeon Creek at low tide.

	Mangrove		**Bedrock**		**Mixed**		
Taxon	**Mean**	**Per Unit**	**Mean**	**Per Unit**	**Mean**	**Per Unit**	**Importance**
Snappers	15,978	76.4	2,862	62.2	972	19.4	Mangrove, Bedrock >> Mixed
Grunts	14,685	70.3	3,432	74.6	1,012	20.2	Mangrove, Bedrock >> Mixed
Parrotfishes	16,061	76.8	6,663	144.9	3,699	74.0	Bedrock >> Mangrove, Mixed

	North		**Middle**		**Southwest**		
Taxon	**Mean**	**Per Unit**	**Mean**	**Per Unit**	**Mean**	**Per Unit**	**Importance**
Snappers	5,241	46.8	6,817	82.1	7,855	71.4	Middle, Southwest > North
Grunts	9,412.5	84.0	3,593	43.3	9,967	90.6	Southwest, North > Middle
Parrotfishes	13,532.5	120.8	2,540	30.6	34,496	313.6	Southwest >> North >> Middle

Table 12. Standing stock estimates (95% confidence intervals) of species >1% total abundance in Pigeon Creek with respect to habitat (mangrove, bedrock, mixed).

		Mangrove			**Bedrock**			**Mixed**	
Species	**Transects**	**Mean -2SE**	**Mean+ 2SE**	**Transects**	**Mean -2SE**	**Mean +2SE**	**Transects**	**Mean -2SE**	**Mean +2SE**
Wrasses	209	427	1,454	46	616	893	50	187	284
Mojarras	209	3,592	7,401	46	640	1,670	50	351	713
Damselfish	209	2,224	3,826	46	1077	1,510	50	406	559
Parrotfish	209	-3,228	35,350	46	1455	11,872	50	1,866	5,532
Gray Snapper	209	1,547	3,573	46	297	845	50	224	416
Grunts	209	11,330	18,041	46	2526	4,339	50	693	1,332
Schoolmaster	209	9,627	17,209	46	1268	3,315	50	292	1,012

Table 13. Standing stock estimates (95% confidence intervals) of species >1% total abundance in Pigeon Creek with respect to section (North, Middle, Southwest).

		North			Middle			Southwest	
Species	**Transects**	**Mean -2SE**	**Mean +2SE**	**Transects**	**Mean -2SE**	**Mean +2SE**	**Transects**	**Mean -2SE**	**Mean +2SE**
Wrasses	112	-158	673	83	855	1,533	110	2,665	2,197
Mojarras	112	3,601	6,678	83	132	2,647	110	523	3,227
Damselfish	112	1,061	2,355	83	1,843	2,901	110	3,737	3,208
Parrotfish	112	-2,037	29,102	83	-10,190	15,270	110	25,629	43,363
Gray Snapper	112	-266	1,370	83	2,025	3,363	110	-750	1,176
Grunts	112	6,703	12,122	83	1,378	5,809	110	9,653	10,281
Schoolmaster	112	1,629	7,749	83	1,622	6,625	110	6,168	9,116

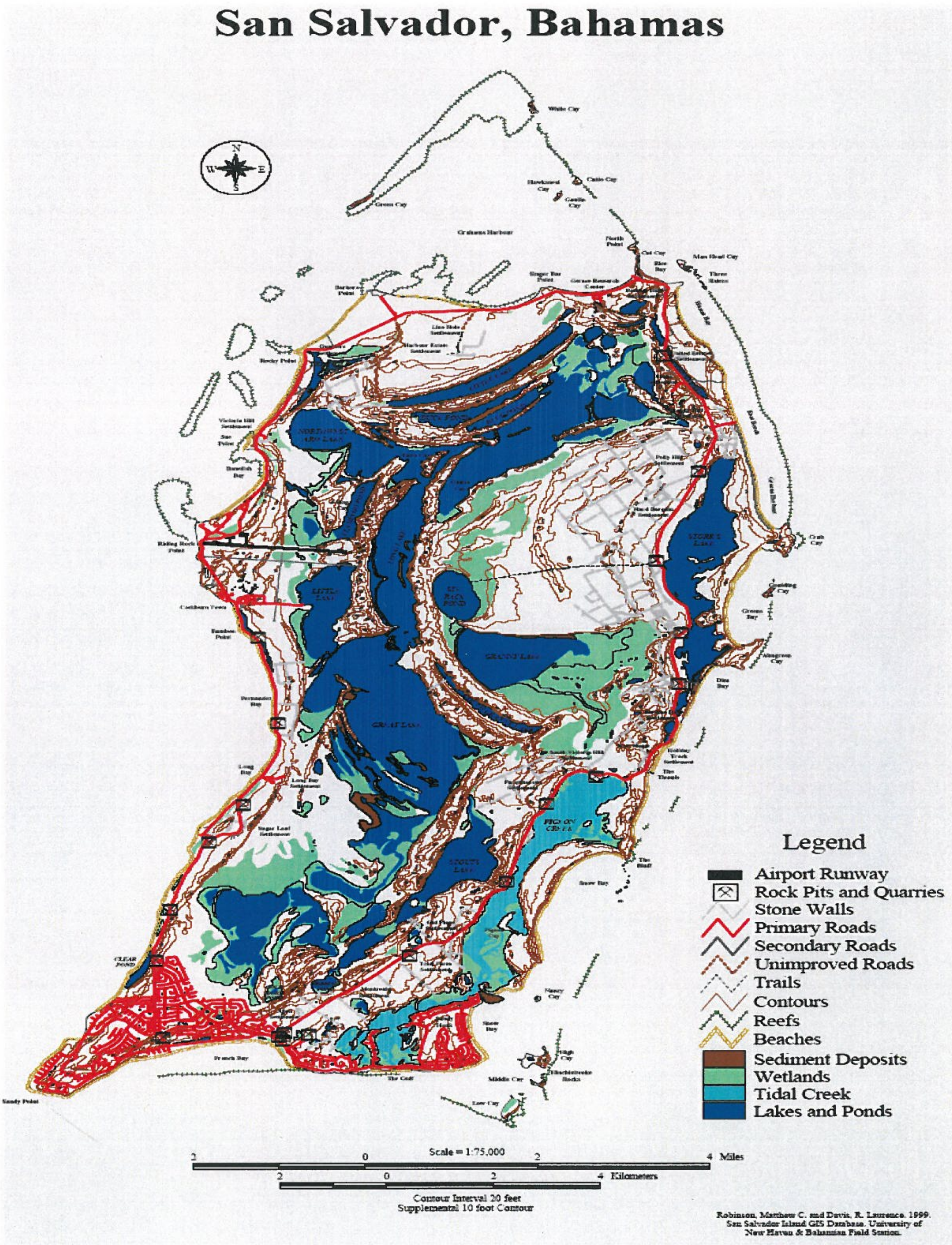

Figure 1. Topographic map of San Salvador, Bahamas. Pigeon Creek is located at the southeastern side of the island (= Tidal Creek in legend).

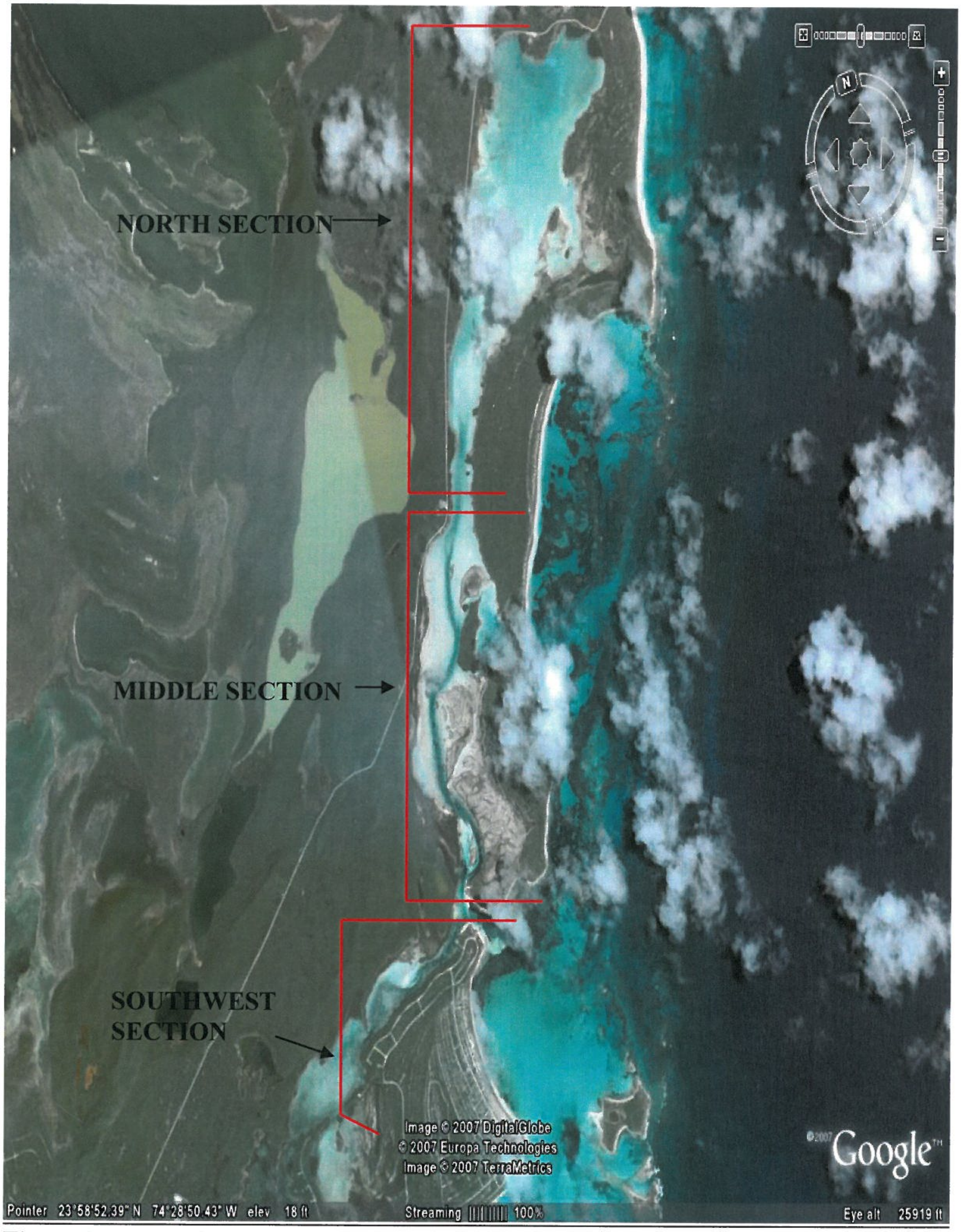

Figure 2. Image of Pigeon Creek at the southeastern end of San Salvador. (Satellite photo by Google Earth)

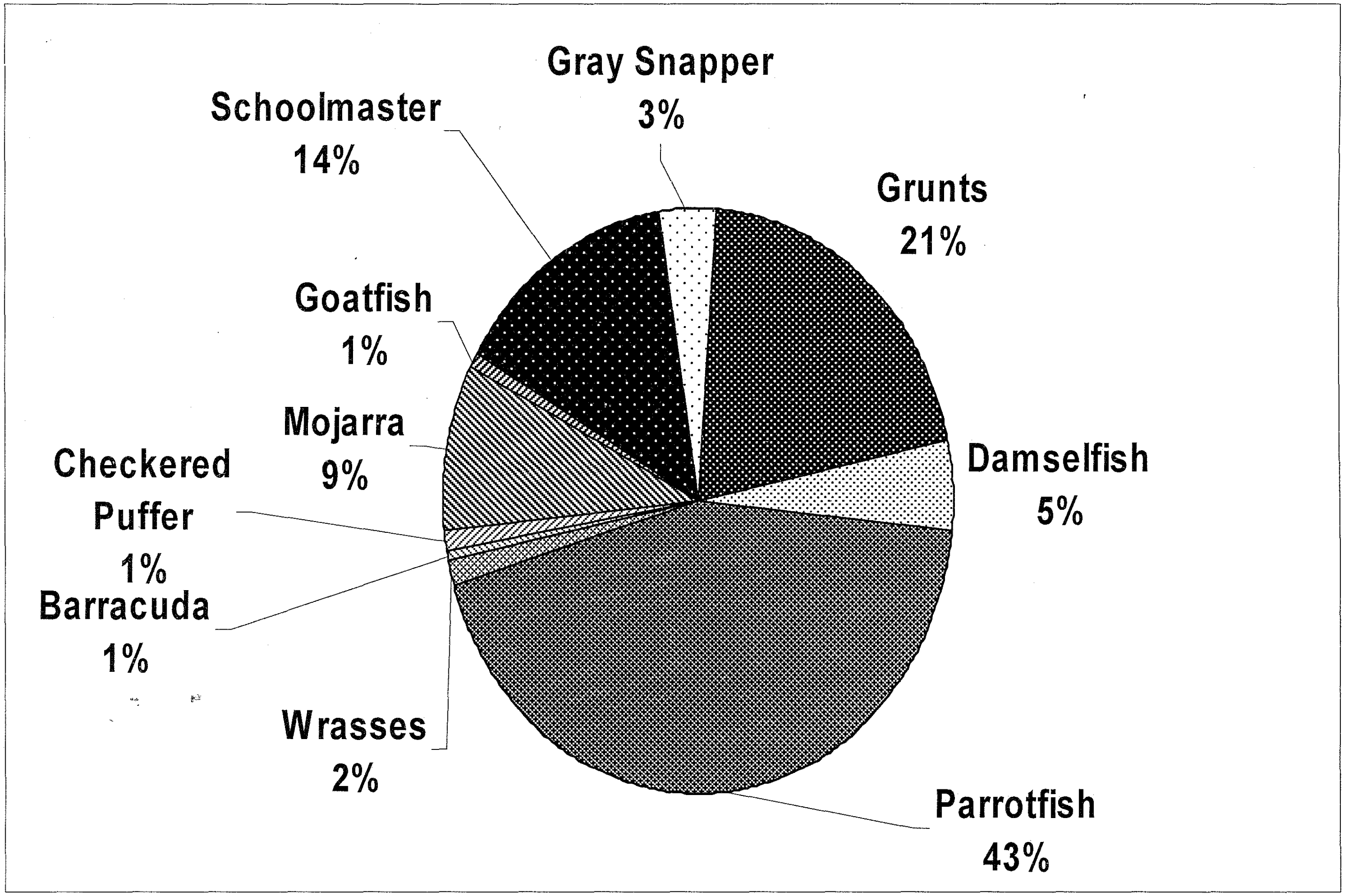

Figure 3. Percent abundance of each taxon >1% of the total abundance of fish counted during June 2006.

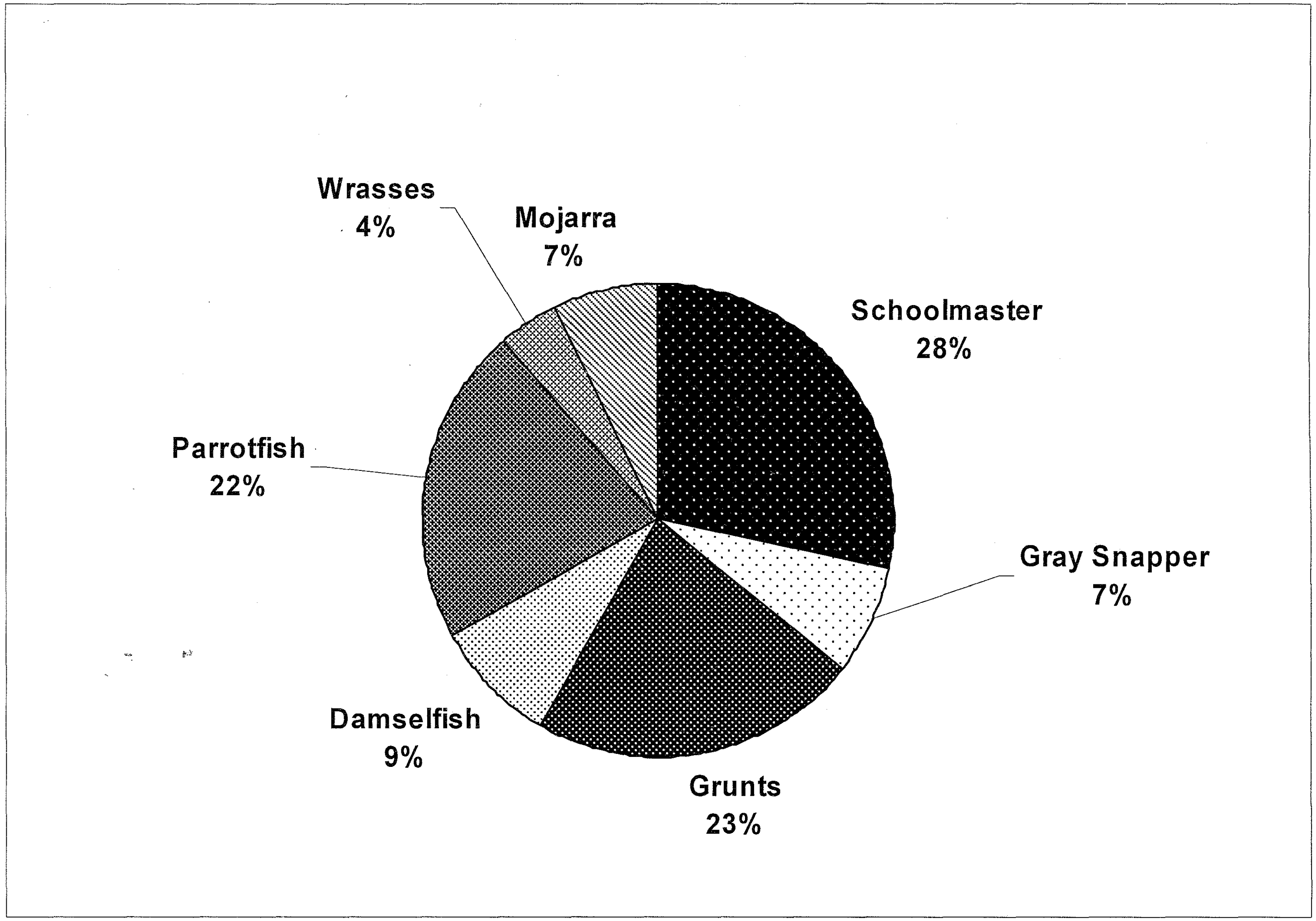

Figure 4. Percent abundance of each taxon >1% of the total abundance of fish counted during January 2007.

Appendix A: Raw Data

Codes

Habitat
1 = Mangrove
2 = Bedrock
3 = Mix

Section
1 = North
2 = Middle
3 = Southwest

Cloud Cover
1 = < 33%
2 = 33 – 66%
3 = >66%

Season
1 = June 2006
2 = January 2007

Visibility
1 = > 6 m
2 = 3 - 6 m
3 = < 3 m

Tide Quarter
1 = ± 3 h peak low tide
2 = next 6 h
3 = ± 3 h peak high tide
4 = next 6 h

Species
1 = Nassau Grouper
2 = Schoolmaster
3 = Mahogany Snapper
4 = Yellowtail Snapper
5 = Gray Snapper
6 = Grunts
7 = Damselfishes
8 = Parrotfishes
9 = Wrasses
10 = Barracuda
11 = Checkered Puffer
12 = Mojarras
13 = Silversides
14 = Butterflyfishes
16 = Sea Chubs
17 = Surgeonfishes
18 = Needlefishes
19 = Angelfishes
20 = Goatfishes
21 = unassigned
22 = Triggerfishes
23 = Squirrelfishes
24 = Porcupinefish
25 = Red Hind

Season	Day	Waypoint	Section	Habitat	Tide	TideQtr	CloudCov	Visibility	Species	Count	Minutes	CPUE	Log (CPUE+1)
1	163	4	1	1	6	1	2	2	2	8	8	60	1.78533
1	163	7	1	1	6	1	2	2	2	1	8	7.5	0.929419
1	163	9	1	1	6	1	2	2	2	4	8	30	1.491362
1	163	14	1	1	4	4	2	2	2	45	8	337.5	2.529559
1	163	20	1	2	4	4	2	2	2	7	10	42	1.633468
1	163	21	1	2	4	4	2	1	2	8	10	48	1.690196
1	157	25	1	3	7	1	3	3	2	3	15	12	1.113943
1	157	32	1	2	6	1	3	3	2	1	16	3.8	0.676694
1	157	33	1	2	6	1	3	3	2	6	15	24	1.39794
1	157	35	1	3	6	1	3	3	2	16	13	73.8	1.874169
1	157	38	1	2	6	1	3	3	2	2	14	8.6	0.980977
1	171	63	1	1	10	2	2	3	2	8	11	43.6	1.649689
1	171	66	1	1	9	2	2	2	2	10	10	60	1.78533
1	164	85	1	1	7	1	1	2	2	3	10	18	1.278754
1	164	86	1	1	6	1	2	2	2	6	10	36	1.568202
1	164	87	1	1	6	1	1	1	2	6	10	36	1.568202
1	164	88	1	1	5	1	1	2	2	4	10	24	1.39794
1	164	89	1	1	5	1	1	1	2	10	10	60	1.78533
1	164	90	1	1	5	1	1	1	2	13	10	78	1.897627
1	164	91	1	1	4	4	1	1	2	12	10	72	1.863323
1	164	93	1	1	7	1	2	3	2	7	10	42	1.633468
1	170	138	2	1	2	4	1	1	2	1	10	6	0.845098
1	170	141	2	1	2	4	1	1	2	19	10	114	2.060698
1	170	143	2	1	3	4	2	2	2	10	10	60	1.78533
1	171	184	2	1	11	3	2	3	2	25	10	150	2.178977
1	171	185	2	3	11	3	2	2	2	8	10	48	1.690196
1	166	187	2	1	6	1	1	2	2	14	10	84	1.929419
1	166	194	2	1	5	1	1	3	2	7	10	42	1.633468
1	166	195	2	1	5	1	1	3	2	3	10	18	1.278754

1	166	197	2	1	5	1	1	2	2	8	11	43.6	1.649689
1	166	198	2	2	4	4	1	3	2	7	11	38.2	1.593085
1	166	199	2	2	4	4	1	2	2	11	10	66	1.826075
1	166	200	2	1	3	4	1	2	2	47	10	282	2.451786
1	168	233	3	3	4	4	1	1	2	14	10	84	1.929419
1	168	234	3	1	4	4	1	1	2	31	10	186	2.271842
1	168	235	3	3	4	4	1	1	2	15	10	90	1.959041
1	158	238	3	3	8	2	3	3	2	7	20	21	1.342423
1	158	241	3	1	7	1	3	3	2	6	21	17.1	1.258706
1	171	243	3	1	9	2	1	2	2	127	10	762	2.882525
1	171	246	3	3	9	2	1	2	2	5	10	30	1.491362
1	158	248	3	1	7	1	3	3	2	14	23	36.5	1.574283
1	158	249	3	1	6	1	3	3	2	11	28	23.6	1.39043
1	165	257	3	1	6	1	1	1	2	20	10	120	2.082785
1	165	260	3	1	6	1	1	1	2	10	12	50	1.70757
1	165	263	3	1	6	1	1	1	2	17	11	92.7	1.971866
1	165	266	3	1	6	1	1	1	2	27	12	135	2.133539
1	165	267	3	1	5	1	1	1	2	55	10	330	2.519828
1	165	268	3	1	5	1	1	1	2	23	10	138	2.143015
1	171	289	3	1	8	2	1	2	2	8	11	43.6	1.649689
1	170	305	3	3	12	3	1	1	2	8	10	48	1.690196
1	170	307	3	1	12	3	1	1	2	9	12	45	1.662758
1	170	309	3	1	1	3	2	2	2	5	10	30	1.491362
1	170	311	3	1	1	3	1	1	2	7	10	42	1.633468
1	161	318	2	1	8	2	2	2	2	27	8	202.5	2.308564
1	161	319	2	1	9	2	2	2	2	10	11	54.5	1.744649
1	161	327	2	3	8	2	2	2	2	7	8	52.5	1.728354
1	161	329	2	1	8	2	2	2	2	8	11	43.6	1.649689
1	163	330	1	1	5	1	2	2	2	5	8	37.5	1.585461
2	5	4	1	1	6	1	3	3	2	5	12	25	1.414973
2	5	5	1	2	6	1	3	3	2	9	12	45	1.662758
2	5	9	1	1	6	1	3	2	2	3	12	15	1.20412
2	5	14	1	1	5	1	3	2	2	19	12	95	1.982271

2	5	20	1	2	5	1	3	2	2	9	12	45	1.662758
2	5	21	1	2	5	1	3	2	2	8	12	40	1.612784
2	5	25	1	3	4	4	2	2	2	7	12	35	1.556303
2	18	32	1	3	6	1	1	1	2	23	12	115	2.064458
2	18	33	1	3	6	1	1	1	2	6	12	30	1.491362
2	18	35	1	3	7	1	1	1	2	17	12	85	1.934498
2	18	38	1	2	7	1	1	1	2	14	12	70	1.851258
2	17	85	1	1	8	2	3	3	2	0	12	0	0
2	17	86	1	1	7	1	3	3	2	1	12	5	0.778151
2	17	87	1	1	6	1	3	3	2	3	12	15	1.20412
2	17	88	1	1	7	1	3	3	2	5	12	25	1.414973
2	17	89	1	1	6	1	3	3	2	5	12	25	1.414973
2	17	90	1	1	6	1	3	3	2	5	12	25	1.414973
2	17	91	1	1	6	1	3	3	2	7	12	35	1.556303
2	17	93	1	1	6	1	3	3	2	3	12	15	1.20412
2	9	138	2	1	4	4	2	3	2	6	12	30	1.491362
2	9	141	2	1	3	4	2	2	2	126	12	630	2.800029
2	9	143	2	1	3	4	2	2	2	82	12	410	2.613842
2	14	184	2	1	7	1	1	2	2	0	12	0	0
2	14	185	2	1	7	1	1	2	2	0	12	0	0
2	14	187	2	1	7	1	1	2	2	2	12	10	1.041393
2	8	194	2	1	5	1	2	2	2	2	12	10	1.041393
2	8	195	2	1	5	1	3	2	2	3	12	15	1.20412
2	8	197	2	3	4	4	3	2	2	7	12	35	1.556303
2	8	198	2	3	4	4	3	3	2	3	12	15	1.20412
2	8	199	2	2	3	4	3	1	2	51	12	255	2.40824
2	8	200	2	1	3	4	3	3	2	7	12	35	1.556303
2	6	233	3	3	6	1	2	2	2	3	12	15	1.20412
2	6	234	3	3	6	1	2	3	2	20	12	100	2.004321
2	6	235	3	3	5	1	2	3	2	12	12	60	1.78533
2	7	238	3	3	4	4	1	1	2	32	12	160	2.206826
2	6	241	3	1	5	1	2	3	2	8	12	40	1.612784
2	18	243	3	1	8	2	2	2	2	37	12	185	2.269513

2	6	244	3	3	5	1	2	2	2	20	12	100	2.004321
2	6	247	3	1	4	4	2	2	2	6	12	30	1.491362
2	6	248	3	1	4	4	2	2	2	13	12	65	1.819544
2	18	249	3	1	8	2	3	2	2	48	12	240	2.382017
2	16	260	3	1	6	1	1	2	2	8	12	40	1.612784
2	16	263	3	1	5	1	1	1	2	1	12	5	0.778151
2	16	266	3	1	6	1	1	1	2	8	12	40	1.612784
2	16	267	3	1	6	1	1	1	2	19	12	95	1.982271
2	16	268	3	2	6	1	1	1	2	19	12	95	1.982271
2	7	305	3	1	4	4	1	1	2	0	12	0	0
2	7	307	3	1	6	1	1	2	2	64	12	320	2.506505
2	7	309	3	1	5	1	1	2	2	1	12	5	0.778151
2	7	311	3	1	6	1	1	2	2	21	12	105	2.025306
2	15	318	2	1	6	1	1	3	2	27	12	135	2.133539
2	15	319	2	1	7	1	1	2	2	67	12	335	2.526339
2	15	327	2	1	6	1	1	1	2	6	12	30	1.491362
2	15	329	2	1	6	1	3	1	2	18	12	90	1.959041
1	170	309	3	1	1	3	2	2	3	0	10	0	0
1	170	311	3	1	1	3	1	1	3	0	10	0	0
1	170	138	2	1	2	4	1	1	3	0	10	0	0
1	170	141	2	1	2	4	1	1	3	0	10	0	0
2	8	199	2	2	3	4	3	1	3	0	12	0	0
2	8	200	2	1	3	4	3	3	3	0	12	0	0
2	9	141	2	1	3	4	2	2	3	0	12	0	0
2	9	143	2	1	3	4	2	2	3	0	12	0	0
1	166	200	2	1	3	4	1	2	3	0	10	0	0
1	170	143	2	1	3	4	2	2	3	0	10	0	0
2	5	25	1	3	4	4	2	2	3	0	12	0	0
2	6	247	3	1	4	4	2	2	3	0	12	0	0
2	6	248	3	1	4	4	2	2	3	0	12	0	0
2	7	238	3	3	4	4	1	1	3	0	12	0	0
2	7	305	3	1	4	4	1	1	3	0	12	0	0
2	8	197	2	3	4	4	3	2	3	0	12	0	0

2	8	198	2	3	4	4	3	3	3	0	12	0	0
2	9	138	2	1	4	4	2	3	3	0	12	0	0
1	163	14	1	1	4	4	2	2	3	2	8	15	1.20412
1	163	20	1	2	4	4	2	2	3	0	10	0	0
1	163	21	1	2	4	4	2	1	3	0	10	0	0
1	164	91	1	1	4	4	1	1	3	0	10	0	0
1	166	198	2	2	4	4	1	3	3	0	11	0	0
1	166	199	2	2	4	4	1	2	3	0	10	0	0
1	168	233	3	3	4	4	1	1	3	0	10	0	0
1	168	234	3	1	4	4	1	1	3	0	10	0	0
1	168	235	3	3	4	4	1	1	3	0	10	0	0
2	5	14	1	1	5	1	3	2	3	0	12	0	0
2	5	20	1	2	5	1	3	2	3	0	12	0	0
2	5	21	1	2	5	1	3	2	3	0	12	0	0
2	6	235	3	3	5	1	2	3	3	0	12	0	0
2	6	241	3	1	5	1	2	3	3	0	12	0	0
2	6	244	3	3	5	1	2	2	3	0	12	0	0
2	7	309	3	1	5	1	1	2	3	0	12	0	0
2	8	194	2	1	5	1	2	2	3	0	12	0	0
2	8	195	2	1	5	1	3	2	3	0	12	0	0
2	16	263	3	1	5	1	1	1	3	0	12	0	0
1	163	330	1	1	5	1	2	2	3	0	8	0	0
1	164	88	1	1	5	1	1	2	3	0	10	0	0
1	164	89	1	1	5	1	1	1	3	0	10	0	0
1	164	90	1	1	5	1	1	1	3	0	10	0	0
1	165	267	3	1	5	1	1	1	3	0	10	0	0
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2	16	266	3	1	6	1	1	1	3	0	12	0	0
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1	168	233	3	3	4	4	1	1	4	0	10	0	0
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1	158	238	3	3	8	2	3	3	4	0	20	0	0
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2	5	14	1	1	5	1	3	2	4	2	12	10	1.041393
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2	9	143	2	1	3	4	2	2	4	0	12	0	0
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2	16	260	3	1	6	1	1	2	4	0	12	0	0
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2	16	267	3	1	6	1	1	1	4	3	12	15	1.20412
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2	7	307	3	1	6	1	1	2	4	1	12	5	0.778151
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2	15	318	2	1	6	1	1	3	4	0	12	0	0
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1	163	9	1	1	6	1	2	2	5	0	8	0	0
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1	171	63	1	1	10	2	2	3	5	11	11	16.4	1.239641
1	171	66	1	1	9	2	2	2	5	0	10	0	0
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1	164	86	1	1	6	1	2	2	5	13	10	36	1.568202
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1	164	90	1	1	5	1	1	1	5	0	10	0	0
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1	168	233	3	3	4	4	1	1	5	0	10	0	0
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1	165	266	3	1	6	1	1	1	5	1	12	5	0.778151
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2	14	184	2	1	7	1	1	2	5	0	12	0	0
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2	8	199	2	2	3	4	3	1	5	28	12	140	2.149219
2	8	200	2	1	3	4	3	3	5	41	12	205	2.313867

2	6	233	3	3	6	1	2	2	5	0	12	0	0
2	6	234	3	3	6	1	2	3	5	1	12	5	0.778151
2	6	235	3	3	5	1	2	3	5	0	12	0	0
2	7	238	3	3	4	4	1	1	5	0	12	0	0
2	6	241	3	1	5	1	2	3	5	1	12	5	0.778151
2	18	243	3	1	8	2	2	2	5	0	12	0	0
2	6	244	3	3	5	1	2	2	5	0	12	0	0
2	6	247	3	1	4	4	2	2	5	0	12	0	0
2	6	248	3	1	4	4	2	2	5	0	12	0	0
2	18	249	3	1	8	2	3	2	5	17	12	85	1.934498
2	16	260	3	1	6	1	1	2	5	15	12	75	1.880814
2	16	263	3	1	5	1	1	1	5	0	12	0	0
2	16	266	3	1	6	1	1	1	5	0	12	0	0
2	16	267	3	1	6	1	1	1	5	14	12	70	1.851258
2	16	268	3	2	6	1	1	1	5	2	12	10	1.041393
2	7	305	3	1	4	4	1	1	5	0	12	0	0
2	7	307	3	1	6	1	1	2	5	0	12	0	0
2	7	309	3	1	5	1	1	2	5	0	12	0	0
2	7	311	3	1	6	1	1	2	5	0	12	0	0
2	15	318	2	1	6	1	1	3	5	15	12	75	1.880814
2	15	319	2	1	7	1	1	2	5	8	12	40	1.612784
2	15	327	2	1	6	1	1	1	5	0	12	0	0
2	15	329	2	1	6	1	3	1	5	0	12	0	0
1	163	4	1	1	6	1	2	2	6	37	8	277.5	2.444825
1	163	7	1	1	6	1	2	2	6	21	8	157.5	2.200029
1	163	9	1	1	6	1	2	2	6	5	8	37.5	1.585461
1	163	14	1	1	4	4	2	2	6	60	8	450	2.654177
1	163	20	1	2	4	4	2	2	6	3	10	18	1.278754
1	163	21	1	2	4	4	2	1	6	40	10	240	2.382017
1	157	25	1	3	7	1	3	3	6	37	15	148	2.173186
1	157	32	1	2	6	1	3	3	6	0	16	0	0
1	157	33	1	2	6	1	3	3	6	21	15	84	1.929419
1	157	35	1	3	6	1	3	3	6	17	13	78.5	1.900157

1	157	38	1	2	6	1	3	3	6	21	14	90	1.959041
1	171	63	1	1	10	2	2	3	6	26	11	141.8	2.154783
1	171	66	1	1	9	2	2	2	6	8	10	48	1.690196
1	164	85	1	1	7	1	1	2	6	23	10	138	2.143015
1	164	86	1	1	6	1	2	2	6	60	10	360	2.557507
1	164	87	1	1	6	1	1	1	6	16	10	96	1.986772
1	164	88	1	1	5	1	1	2	6	89	10	534	2.728354
1	164	89	1	1	5	1	1	1	6	91	10	546	2.737987
1	164	90	1	1	5	1	1	1	6	40	10	240	2.382017
1	164	91	1	1	4	4	1	1	6	28	10	168	2.227887
1	164	93	1	1	7	1	2	3	6	49	10	294	2.469822
1	170	138	2	1	2	4	1	1	6	3	10	18	1.278754
1	170	141	2	1	2	4	1	1	6	62	10	372	2.571709
1	170	143	2	1	3	4	2	2	6	4	10	24	1.39794
1	171	184	2	1	11	3	2	3	6	4	10	24	1.39794
1	171	185	2	3	11	3	2	2	6	6	10	36	1.568202
1	166	187	2	1	6	1	1	2	6	68	10	408	2.611723
1	166	194	2	1	5	1	1	3	6	0	10	0	0
1	166	195	2	1	5	1	1	3	6	7	10	42	1.633468
1	166	197	2	1	5	1	1	2	6	6	11	32.7	1.527981
1	166	198	2	2	4	4	1	3	6	16	11	87.3	1.945827
1	166	199	2	2	4	4	1	2	6	15	10	90	1.959041
1	166	200	2	1	3	4	1	2	6	20	10	120	2.082785
1	168	233	3	3	4	4	1	1	6	0	10	0	0
1	168	234	3	1	4	4	1	1	6	6	10	36	1.568202
1	168	235	3	3	4	4	1	1	6	0	10	0	0
1	158	238	3	3	8	2	3	3	6	57	20	171	2.235528
1	158	241	3	1	7	1	3	3	6	13	21	37.1	1.581413
1	171	243	3	1	9	2	1	2	6	18	10	108	2.037426
1	171	246	3	3	9	2	1	2	6	16	10	96	1.986772
1	158	248	3	1	7	1	3	3	6	6	23	15.7	1.221471
1	158	249	3	1	6	1	3	3	6	2	28	4.3	0.723104
1	165	257	3	1	6	1	1	1	6	21	10	126	2.103804

1	165	260	3	1	6	1	1	1	6	0	12	0	0
1	165	263	3	1	6	1	1	1	6	13	11	70.9	1.856784
1	165	266	3	1	6	1	1	1	6	6	12	30	1.491362
1	165	267	3	1	5	1	1	1	6	22	10	132	2.123852
1	165	268	3	1	5	1	1	1	6	36	10	216	2.33646
1	171	289	3	1	8	2	1	2	6	15	11	81.8	1.918126
1	170	305	3	3	12	3	1	1	6	0	10	0	0
1	170	307	3	1	12	3	1	1	6	6	12	30	1.491362
1	170	309	3	1	1	3	2	2	6	1	10	6	0.845098
1	170	311	3	1	1	3	1	1	6	13	10	78	1.897627
1	161	318	2	1	8	2	2	2	6	4	8	30	1.491362
1	161	319	2	1	9	2	2	2	6	9	11	49.1	1.699759
1	161	327	2	3	8	2	2	2	6	0	8	0	0
1	161	329	2	1	8	2	2	2	6	9	11	49.1	1.699759
1	163	330	1	1	5	1	2	2	6	15	8	112.5	2.054996
2	5	4	1	1	6	1	3	3	6	4	12	20	1.322219
2	5	5	1	2	6	1	3	3	6	0	12	0	0
2	5	9	1	1	6	1	3	2	6	4	12	20	1.322219
2	5	14	1	1	5	1	3	2	6	31	12	155	2.193125
2	5	20	1	2	5	1	3	2	6	0	12	0	0
2	5	21	1	2	5	1	3	2	6	1	12	5	0.778151
2	5	25	1	3	4	4	2	2	6	51	12	255	2.40824
2	18	32	1	3	6	1	1	1	6	32	12	160	2.206826
2	18	33	1	3	6	1	1	1	6	15	12	75	1.880814
2	18	35	1	3	7	1	1	1	6	7	12	35	1.556303
2	18	38	1	2	7	1	1	1	6	0	12	0	0
2	17	85	1	1	8	2	3	3	6	0	12	0	0
2	17	86	1	1	7	1	3	3	6	1	12	5	0.778151
2	17	87	1	1	6	1	3	3	6	28	12	140	2.149219
2	17	88	1	1	7	1	3	3	6	7	12	35	1.556303
2	17	89	1	1	6	1	3	3	6	28	12	140	2.149219
2	17	90	1	1	6	1	3	3	6	8	12	40	1.612784
2	17	91	1	1	6	1	3	3	6	15	12	75	1.880814

2	17	93	1	1	6	1	3	3	6	3	12	15	1.20412
2	9	138	2	1	4	4	2	3	6	1	12	5	0.778151
2	9	141	2	1	3	4	2	2	6	79	12	395	2.597695
2	9	143	2	1	3	4	2	2	6	3	12	15	1.20412
2	14	184	2	1	7	1	1	2	6	0	12	0	0
2	14	185	2	1	7	1	1	2	6	0	12	0	0
2	14	187	2	1	7	1	1	2	6	0	12	0	0
2	8	194	2	1	5	1	2	2	6	23	12	115	2.064458
2	8	195	2	1	5	1	3	2	6	5	12	25	1.414973
2	8	197	2	3	4	4	3	2	6	15	12	75	1.880814
2	8	198	2	3	4	4	3	3	6	13	12	65	1.819544
2	8	199	2	2	3	4	3	1	6	16	12	80	1.908485
2	8	200	2	1	3	4	3	3	6	8	12	40	1.612784
2	6	233	3	3	6	1	2	2	6	0	12	0	0
2	6	234	3	3	6	1	2	3	6	12	12	60	1.78533
2	6	235	3	3	5	1	2	3	6	2	12	10	1.041393
2	7	238	3	3	4	4	1	1	6	4	12	20	1.322219
2	6	241	3	1	5	1	2	3	6	21	12	105	2.025306
2	18	243	3	1	8	2	2	2	6	36	12	180	2.257679
2	6	244	3	3	5	1	2	2	6	9	12	45	1.662758
2	6	247	3	1	4	4	2	2	6	11	12	55	1.748188
2	6	248	3	1	4	4	2	2	6	16	12	80	1.908485
2	18	249	3	1	8	2	3	2	6	14	12	70	1.851258
2	16	260	3	1	6	1	1	2	6	27	12	135	2.133539
2	16	263	3	1	5	1	1	1	6	4	12	20	1.322219
2	16	266	3	1	6	1	1	1	6	2	12	10	1.041393
2	16	267	3	1	6	1	1	1	6	36	12	180	2.257679
2	16	268	3	2	6	1	1	1	6	48	12	240	2.382017
2	7	305	3	1	4	4	1	1	6	0	12	0	0
2	7	307	3	1	6	1	1	2	6	13	12	65	1.819544
2	7	309	3	1	5	1	1	2	6	0	12	0	0
2	7	311	3	1	6	1	1	2	6	32	12	160	2.206826
2	15	318	2	1	6	1	1	3	6	8	12	40	1.612784

2	15	319	2	1	7	1	1	2	6	8	12	40	1.612784
2	15	327	2	1	6	1	1	1	6	2	12	10	1.041393
2	15	329	2	1	6	1	3	1	6	12	12	60	1.78533
1	170	309	3	1	1	3	2	2	7	0	10	0	0
1	170	311	3	1	1	3	1	1	7	5	10	30	1.491362
1	170	138	2	1	2	4	1	1	7	0	10	0	0
1	170	141	2	1	2	4	1	1	7	10	10	60	1.78533
2	8	199	2	2	3	4	3	1	7	17	12	85	1.934498
2	8	200	2	1	3	4	3	3	7	9	12	45	1.662758
2	9	141	2	1	3	4	2	2	7	13	12	65	1.819544
2	9	143	2	1	3	4	2	2	7	10	12	50	1.70757
1	166	200	2	1	3	4	1	2	7	9	10	54	1.740363
1	170	143	2	1	3	4	2	2	7	4	10	24	1.39794
2	5	25	1	3	4	4	2	2	7	12	12	60	1.78533
2	6	247	3	1	4	4	2	2	7	4	12	20	1.322219
2	6	248	3	1	4	4	2	2	7	11	12	55	1.748188
2	7	238	3	3	4	4	1	1	7	14	12	70	1.851258
2	7	305	3	1	4	4	1	1	7	0	12	0	0
2	8	197	2	3	4	4	3	2	7	4	12	20	1.322219
2	8	198	2	3	4	4	3	3	7	5	12	25	1.414973
2	9	138	2	1	4	4	2	3	7	0	12	0	0
1	163	14	1	1	4	4	2	2	7	8	8	60	1.78533
1	163	20	1	2	4	4	2	2	7	8	10	48	1.690196
1	163	21	1	2	4	4	2	1	7	15	10	90	1.959041
1	164	91	1	1	4	4	1	1	7	0	10	0	0
1	166	198	2	2	4	4	1	3	7	11	11	60	1.78533
1	166	199	2	2	4	4	1	2	7	15	10	90	1.959041
1	168	233	3	3	4	4	1	1	7	10	10	60	1.78533
1	168	234	3	1	4	4	1	1	7	0	10	0	0
1	168	235	3	3	4	4	1	1	7	22	10	132	2.123852
2	5	14	1	1	5	1	3	2	7	7	12	35	1.556303
2	5	20	1	2	5	1	3	2	7	11	12	55	1.748188
2	5	21	1	2	5	1	3	2	7	14	12	70	1.851258

2	6	235	3	3	5	1	2	3	7	11	12	55	1.748188
2	6	241	3	1	5	1	2	3	7	2	12	10	1.041393
2	6	244	3	3	5	1	2	2	7	11	12	55	1.748188
2	7	309	3	1	5	1	1	2	7	0	12	0	0
2	8	194	2	1	5	1	2	2	7	2	12	10	1.041393
2	8	195	2	1	5	1	3	2	7	8	12	40	1.612784
2	16	263	3	1	5	1	1	1	7	0	12	0	0
1	163	330	1	1	5	1	2	2	7	4	8	30	1.491362
1	164	88	1	1	5	1	1	2	7	0	10	0	0
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1	164	90	1	1	5	1	1	1	7	1	10	6	0.845098
1	165	267	3	1	5	1	1	1	7	0	10	0	0
1	165	268	3	1	5	1	1	1	7	9	10	54	1.740363
1	166	194	2	1	5	1	1	3	7	1	10	6	0.845098
1	166	195	2	1	5	1	1	3	7	8	10	48	1.690196
1	166	197	2	1	5	1	1	2	7	5	11	27.3	1.451368
2	5	4	1	1	6	1	3	3	7	2	12	10	1.041393
2	5	5	1	2	6	1	3	3	7	8	12	40	1.612784
2	5	9	1	1	6	1	3	2	7	3	12	15	1.20412
2	6	233	3	3	6	1	2	2	7	10	12	50	1.70757
2	6	234	3	3	6	1	2	3	7	7	12	35	1.556303
2	7	307	3	1	6	1	1	2	7	7	12	35	1.556303
2	7	311	3	1	6	1	1	2	7	0	12	0	0
2	15	318	2	1	6	1	1	3	7	2	12	10	1.041393
2	15	327	2	1	6	1	1	1	7	2	12	10	1.041393
2	15	329	2	1	6	1	3	1	7	18	12	90	1.959041
2	16	260	3	1	6	1	1	2	7	1	12	5	0.778151
2	16	266	3	1	6	1	1	1	7	0	12	0	0
2	16	267	3	1	6	1	1	1	7	4	12	20	1.322219
2	16	268	3	2	6	1	1	1	7	5	12	25	1.414973
2	17	87	1	1	6	1	3	3	7	0	12	0	0
2	17	89	1	1	6	1	3	3	7	0	12	0	0
2	17	90	1	1	6	1	3	3	7	0	12	0	0

2	17	91	1	1	6	1	3	3	7	0	12	0	0
2	17	93	1	1	6	1	3	3	7	0	12	0	0
2	18	32	1	3	6	1	1	1	7	4	12	20	1.322219
2	18	33	1	3	6	1	1	1	7	3	12	15	1.20412
1	157	32	1	2	6	1	3	3	7	0	16	0	0
1	157	33	1	2	6	1	3	3	7	1	15	4	0.69897
1	157	35	1	3	6	1	3	3	7	2	13	9.2	1.009908
1	157	38	1	2	6	1	3	3	7	2	14	8.6	0.980977
1	158	249	3	1	6	1	3	3	7	3	28	6.4	0.870905
1	163	4	1	1	6	1	2	2	7	13	8	97.5	1.993436
1	163	7	1	1	6	1	2	2	7	4	8	30	1.491362
1	163	9	1	1	6	1	2	2	7	0	8	0	0
1	164	86	1	1	6	1	2	2	7	0	10	0	0
1	164	87	1	1	6	1	1	1	7	0	10	0	0
1	165	257	3	1	6	1	1	1	7	7	10	42	1.633468
1	165	260	3	1	6	1	1	1	7	3	12	15	1.20412
1	165	263	3	1	6	1	1	1	7	2	11	10.9	1.075879
1	165	266	3	1	6	1	1	1	7	0	12	0	0
1	166	187	2	1	6	1	1	2	7	1	10	6	0.845098
2	14	184	2	1	7	1	1	2	7	0	12	0	0
2	14	185	2	1	7	1	1	2	7	0	12	0	0
2	14	187	2	1	7	1	1	2	7	7	12	35	1.556303
2	15	319	2	1	7	1	1	2	7	5	12	25	1.414973
2	17	86	1	1	7	1	3	3	7	0	12	0	0
2	17	88	1	1	7	1	3	3	7	0	12	0	0
2	18	35	1	3	7	1	1	1	7	0	12	0	0
2	18	38	1	2	7	1	1	1	7	2	12	10	1.041393
1	157	25	1	3	7	1	3	3	7	1	15	4	0.69897
1	158	241	3	1	7	1	3	3	7	5	21	14.3	1.184286
1	158	248	3	1	7	1	3	3	7	3	23	7.8	0.945768
1	164	85	1	1	7	1	1	2	7	0	10	0	0
1	164	93	1	1	7	1	2	3	7	0	10	0	0
2	17	85	1	1	8	2	3	3	7	0	12	0	0

2	18	243	3	1	8	2	2	2	7	13	12	65	1.819544
2	18	249	3	1	8	2	3	2	7	4	12	20	1.322219
1	158	238	3	3	8	2	3	3	7	16	20	48	1.690196
1	161	318	2	1	8	2	2	2	7	5	8	37.5	1.585461
1	161	327	2	3	8	2	2	2	7	7	8	52.5	1.728354
1	161	329	2	1	8	2	2	2	7	8	11	43.6	1.649689
1	171	289	3	1	8	2	1	2	7	1	11	5.5	0.809866
1	161	319	2	1	9	2	2	2	7	8	11	43.6	1.649689
1	171	66	1	1	9	2	2	2	7	0	10	0	0
1	171	243	3	1	9	2	1	2	7	4	10	24	1.39794
1	171	246	3	3	9	2	1	2	7	24	10	144	2.161368
1	171	63	1	1	10	2	2	3	7	0	11	0	0
1	171	184	2	1	11	3	2	3	7	8	10	48	1.690196
1	171	185	2	3	11	3	2	2	7	4	10	24	1.39794
1	170	305	3	3	12	3	1	1	7	0	10	0	0
1	170	307	3	1	12	3	1	1	7	5	12	25	1.414973
1	170	309	3	1	1	3	2	2	8	0	10	0	0
1	170	311	3	1	1	3	1	1	8	150	10	900	2.954725
1	170	138	2	1	2	4	1	1	8	1	10	6	0.845098
1	170	141	2	1	2	4	1	1	8	37	10	222	2.348305
2	8	199	2	2	3	4	3	1	8	78	12	390	2.592177
2	8	200	2	1	3	4	3	3	8	20	12	100	2.004321
2	9	141	2	1	3	4	2	2	8	11	12	55	1.748188
2	9	143	2	1	3	4	2	2	8	7	12	35	1.556303
1	166	200	2	1	3	4	1	2	8	37	10	222	2.348305
1	170	143	2	1	3	4	2	2	8	2	10	12	1.113943
2	5	25	1	3	4	4	2	2	8	37	12	185	2.269513
2	6	247	3	1	4	4	2	2	8	10	12	50	1.70757
2	6	248	3	1	4	4	2	2	8	10	12	50	1.70757
2	7	238	3	3	4	4	1	1	8	59	12	295	2.471292
2	7	305	3	1	4	4	1	1	8	0	12	0	0
2	8	197	2	3	4	4	3	2	8	25	12	125	2.100371
2	8	198	2	3	4	4	3	3	8	10	12	50	1.70757

2	9	138	2	1	4	4	2	3	8	0	12	0	0
1	163	14	1	1	4	4	2	2	8	4	8	30	1.491362
1	163	20	1	2	4	4	2	2	8	0	10	0	0
1	163	21	1	2	4	4	2	1	8	47	10	282	2.451786
1	164	91	1	1	4	4	1	1	8	0	10	0	0
1	166	198	2	2	4	4	1	3	8	115	11	627.3	2.798148
1	166	199	2	2	4	4	1	2	8	27	10	162	2.212188
1	168	233	3	3	4	4	1	1	8	17	10	102	2.012837
1	168	234	3	1	4	4	1	1	8	435	10	2610	3.416807
1	168	235	3	3	4	4	1	1	8	1000	10	6000	3.778224
2	5	14	1	1	5	1	3	2	8	11	12	55	1.748188
2	5	20	1	2	5	1	3	2	8	17	12	85	1.934498
2	5	21	1	2	5	1	3	2	8	66	12	330	2.519828
2	6	235	3	3	5	1	2	3	8	10	12	50	1.70757
2	6	241	3	1	5	1	2	3	8	12	12	60	1.78533
2	6	244	3	3	5	1	2	2	8	31	12	155	2.193125
2	7	309	3	1	5	1	1	2	8	0	12	0	0
2	8	194	2	1	5	1	2	2	8	10	12	50	1.70757
2	8	195	2	1	5	1	3	2	8	19	12	95	1.982271
2	16	263	3	1	5	1	1	1	8	16	12	80	1.908485
1	163	330	1	1	5	1	2	2	8	45	8	337.5	2.529559
1	164	88	1	1	5	1	1	2	8	7	10	42	1.633468
1	164	89	1	1	5	1	1	1	8	6	10	36	1.568202
1	164	90	1	1	5	1	1	1	8	7	10	42	1.633468
1	165	267	3	1	5	1	1	1	8	17	10	102	2.012837
1	165	268	3	1	5	1	1	1	8	83	10	498	2.698101
1	166	194	2	1	5	1	1	3	8	2	10	12	1.113943
1	166	195	2	1	5	1	1	3	8	32	10	192	2.285557
1	166	197	2	1	5	1	1	2	8	34	11	185.5	2.270573
2	5	4	1	1	6	1	3	3	8	2	12	10	1.041393
2	5	5	1	2	6	1	3	3	8	0	12	0	0
2	5	9	1	1	6	1	3	2	8	16	12	80	1.908485
2	6	233	3	3	6	1	2	2	8	15	12	75	1.880814

2	6	234	3	3	6	1	2	3	8	18	12	90	1.959041
2	7	307	3	1	6	1	1	2	8	12	12	60	1.78533
2	7	311	3	1	6	1	1	2	8	2	12	10	1.041393
2	15	318	2	1	6	1	1	3	8	6	12	30	1.491362
2	15	327	2	1	6	1	1	1	8	0	12	0	0
2	15	329	2	1	6	1	3	1	8	6	12	30	1.491362
2	16	260	3	1	6	1	1	2	8	1	12	5	0.778151
2	16	266	3	1	6	1	1	1	8	4	12	20	1.322219
2	16	267	3	1	6	1	1	1	8	5	12	25	1.414973
2	16	268	3	2	6	1	1	1	8	27	12	135	2.133539
2	17	87	1	1	6	1	3	3	8	4	12	20	1.322219
2	17	89	1	1	6	1	3	3	8	2	12	10	1.041393
2	17	90	1	1	6	1	3	3	8	4	12	20	1.322219
2	17	91	1	1	6	1	3	3	8	2	12	10	1.041393
2	17	93	1	1	6	1	3	3	8	0	12	0	0
2	18	32	1	3	6	1	1	1	8	12	12	60	1.78533
2	18	33	1	3	6	1	1	1	8	44	12	220	2.344392
1	157	32	1	2	6	1	3	3	8	0	16	0	0
1	157	33	1	2	6	1	3	3	8	0	15	0	0
1	157	35	1	3	6	1	3	3	8	0	13	0	0
1	157	38	1	2	6	1	3	3	8	1	14	4.3	0.723104
1	158	249	3	1	6	1	3	3	8	7	28	15	1.20412
1	163	4	1	1	6	1	2	2	8	6	8	45	1.662758
1	163	7	1	1	6	1	2	2	8	10	8	75	1.880814
1	163	9	1	1	6	1	2	2	8	1	8	7.5	0.929419
1	164	86	1	1	6	1	2	2	8	9	10	54	1.740363
1	164	87	1	1	6	1	1	1	8	1	10	6	0.845098
1	165	257	3	1	6	1	1	1	8	27	10	162	2.212188
1	165	260	3	1	6	1	1	1	8	0	12	0	0
1	165	263	3	1	6	1	1	1	8	7	11	38.2	1.593085
1	165	266	3	1	6	1	1	1	8	4	12	20	1.322219
1	166	187	2	1	6	1	1	2	8	0	10	0	0
2	14	184	2	1	7	1	1	2	8	0	12	0	0

2	14	185	2	1	7	1	1	2	8	0	12	0	0
2	14	187	2	1	7	1	1	2	8	0	12	0	0
2	15	319	2	1	7	1	1	2	8	8	12	40	1.612784
2	17	86	1	1	7	1	3	3	8	3	12	15	1.20412
2	17	88	1	1	7	1	3	3	8	1	12	5	0.778151
2	18	35	1	3	7	1	1	1	8	23	12	115	2.064458
2	18	38	1	2	7	1	1	1	8	2	12	10	1.041393
1	157	25	1	3	7	1	3	3	8	7	15	28	1.462398
1	158	241	3	1	7	1	3	3	8	12	21	34.3	1.547599
1	158	248	3	1	7	1	3	3	8	6	23	15.7	1.221471
1	164	85	1	1	7	1	1	2	8	0	10	0	0
1	164	93	1	1	7	1	2	3	8	0	10	0	0
2	17	85	1	1	8	2	3	3	8	0	12	0	0
2	18	243	3	1	8	2	2	2	8	10	12	50	1.70757
2	18	249	3	1	8	2	3	2	8	0	12	0	0
1	158	238	3	3	8	2	3	3	8	27	20	81	1.913814
1	161	318	2	1	8	2	2	2	8	25	8	187.5	2.275311
1	161	327	2	3	8	2	2	2	8	4	8	30	1.491362
1	161	329	2	1	8	2	2	2	8	0	11	0	0
1	171	289	3	1	8	2	1	2	8	1	11	5.5	0.809866
1	161	319	2	1	9	2	2	2	8	26	11	141.8	2.154783
1	171	66	1	1	9	2	2	2	8	0	10	0	0
1	171	243	3	1	9	2	1	2	8	21	10	126	2.103804
1	171	246	3	3	9	2	1	2	8	75	10	450	2.654177
1	171	63	1	1	10	2	2	3	8	4	11	21.8	1.358281
1	171	184	2	1	11	3	2	3	8	0	10	0	0
1	171	185	2	3	11	3	2	2	8	1	10	6	0.845098
1	170	305	3	3	12	3	1	1	8	0	10	0	0
1	170	307	3	1	12	3	1	1	8	133	12	665	2.823474
1	170	309	3	1	1	3	2	2	9	0	10	0	0
1	170	311	3	1	1	3	1	1	9	3	10	18	1.278754
1	170	138	2	1	2	4	1	1	9	0	10	0	0
1	170	141	2	1	2	4	1	1	9	6	10	36	1.568202

2	8	199	2	2	3	4	3	1	9	17	12	85	1.934498
2	8	200	2	1	3	4	3	3	9	10	12	50	1.70757
2	9	141	2	1	3	4	2	2	9	6	12	30	1.491362
2	9	143	2	1	3	4	2	2	9	2	12	10	1.041393
1	166	200	2	1	3	4	1	2	9	3	10	18	1.278754
1	170	143	2	1	3	4	2	2	9	0	10	0	0
2	5	25	1	3	4	4	2	2	9	1	12	5	0.778151
2	6	247	3	1	4	4	2	2	9	2	12	10	1.041393
2	6	248	3	1	4	4	2	2	9	3	12	15	1.20412
2	7	238	3	3	4	4	1	1	9	18	12	90	1.959041
2	7	305	3	1	4	4	1	1	9	0	12	0	0
2	8	197	2	3	4	4	3	2	9	2	12	10	1.041393
2	8	198	2	3	4	4	3	3	9	0	12	0	0
2	9	138	2	1	4	4	2	3	9	0	12	0	0
1	163	14	1	1	4	4	2	2	9	0	8	0	0
1	163	20	1	2	4	4	2	2	9	0	10	0	0
1	163	21	1	2	4	4	2	1	9	1	10	6	0.845098
1	164	91	1	1	4	4	1	1	9	0	10	0	0
1	166	198	2	2	4	4	1	3	9	1	11	5.5	0.809866
1	166	199	2	2	4	4	1	2	9	9	10	54	1.740363
1	168	233	3	3	4	4	1	1	9	4	10	24	1.39794
1	168	234	3	1	4	4	1	1	9	3	10	18	1.278754
1	168	235	3	3	4	4	1	1	9	20	10	120	2.082785
2	5	14	1	1	5	1	3	2	9	0	12	0	0
2	5	20	1	2	5	1	3	2	9	3	12	15	1.20412
2	5	21	1	2	5	1	3	2	9	2	12	10	1.041393
2	6	235	3	3	5	1	2	3	9	6	12	30	1.491362
2	6	241	3	1	5	1	2	3	9	1	12	5	0.778151
2	6	244	3	3	5	1	2	2	9	4	12	20	1.322219
2	7	309	3	1	5	1	1	2	9	0	12	0	0
2	8	194	2	1	5	1	2	2	9	0	12	0	0
2	8	195	2	1	5	1	3	2	9	2	12	10	1.041393
2	16	263	3	1	5	1	1	1	9	0	12	0	0

1	163	330	1	1	5	1	2	2	9	2	8	15	1.20412
1	164	88	1	1	5	1	1	2	9	0	10	0	0
1	164	89	1	1	5	1	1	1	9	0	10	0	0
1	164	90	1	1	5	1	1	1	9	0	10	0	0
1	165	267	3	1	5	1	1	1	9	0	10	0	0
1	165	268	3	1	5	1	1	1	9	8	10	48	1.690196
1	166	194	2	1	5	1	1	3	9	0	10	0	0
1	166	195	2	1	5	1	1	3	9	0	10	0	0
1	166	197	2	1	5	1	1	2	9	2	11	10.9	1.075879
2	5	4	1	1	6	1	3	3	9	0	12	0	0
2	5	5	1	2	6	1	3	3	9	0	12	0	0
2	5	9	1	1	6	1	3	2	9	0	12	0	0
2	6	233	3	3	6	1	2	2	9	15	12	75	1.880814
2	6	234	3	3	6	1	2	3	9	3	12	15	1.20412
2	7	307	3	1	6	1	1	2	9	1	12	5	0.778151
2	7	311	3	1	6	1	1	2	9	4	12	20	1.322219
2	15	318	2	1	6	1	1	3	9	4	12	20	1.322219
2	15	327	2	1	6	1	1	1	9	5	12	25	1.414973
2	15	329	2	1	6	1	3	1	9	3	12	15	1.20412
2	16	260	3	1	6	1	1	2	9	0	12	0	0
2	16	266	3	1	6	1	1	1	9	1	12	5	0.778151
2	16	267	3	1	6	1	1	1	9	0	12	0	0
2	16	268	3	2	6	1	1	1	9	6	12	30	1.491362
2	17	87	1	1	6	1	3	3	9	0	12	0	0
2	17	89	1	1	6	1	3	3	9	1	12	5	0.778151
2	17	90	1	1	6	1	3	3	9	0	12	0	0
2	17	91	1	1	6	1	3	3	9	0	12	0	0
2	17	93	1	1	6	1	3	3	9	0	12	0	0
2	18	32	1	3	6	1	1	1	9	0	12	0	0
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1	157	32	1	2	6	1	3	3	9	0	16	0	0
1	157	33	1	2	6	1	3	3	9	0	15	0	0
1	157	35	1	3	6	1	3	3	9	0	13	0	0

1	157	38	1	2	6	1	3	3	9	0	14	0	0
1	158	249	3	1	6	1	3	3	9	0	28	0	0
1	163	4	1	1	6	1	2	2	9	0	8	0	0
1	163	7	1	1	6	1	2	2	9	0	8	0	0
1	163	9	1	1	6	1	2	2	9	0	8	0	0
1	164	86	1	1	6	1	2	2	9	0	10	0	0
1	164	87	1	1	6	1	1	1	9	0	10	0	0
1	165	257	3	1	6	1	1	1	9	0	10	0	0
1	165	260	3	1	6	1	1	1	9	0	12	0	0
1	165	263	3	1	6	1	1	1	9	0	11	0	0
1	165	266	3	1	6	1	1	1	9	0	12	0	0
1	166	187	2	1	6	1	1	2	9	0	10	0	0
2	14	184	2	1	7	1	1	2	9	0	12	0	0
2	14	185	2	1	7	1	1	2	9	0	12	0	0
2	14	187	2	1	7	1	1	2	9	0	12	0	0
2	15	319	2	1	7	1	1	2	9	4	12	20	1.322219
2	17	86	1	1	7	1	3	3	9	0	12	0	0
2	17	88	1	1	7	1	3	3	9	0	12	0	0
2	18	35	1	3	7	1	1	1	9	0	12	0	0
2	18	38	1	2	7	1	1	1	9	2	12	10	1.041393
1	157	25	1	3	7	1	3	3	9	0	15	0	0
1	158	241	3	1	7	1	3	3	9	2	21	5.7	0.827
1	158	248	3	1	7	1	3	3	9	0	23	0	0
1	164	85	1	1	7	1	1	2	9	0	10	0	0
1	164	93	1	1	7	1	2	3	9	0	10	0	0
2	17	85	1	1	8	2	3	3	9	0	12	0	0
2	18	243	3	1	8	2	2	2	9	3	12	15	1.20412
2	18	249	3	1	8	2	3	2	9	2	12	10	1.041393
1	158	238	3	3	8	2	3	3	9	2	20	6	0.845098
1	161	318	2	1	8	2	2	2	9	2	8	15	1.20412
1	161	327	2	3	8	2	2	2	9	3	8	22.5	1.371068
1	161	329	2	1	8	2	2	2	9	0	11	0	0
1	171	289	3	1	8	2	1	2	9	0	11	0	0

1	161	319	2	1	9	2	2	2	9	0	11	0	0
1	171	66	1	1	9	2	2	2	9	0	10	0	0
1	171	243	3	1	9	2	1	2	9	1	10	6	0.845098
1	171	246	3	3	9	2	1	2	9	13	10	78	1.897627
1	171	63	1	1	10	2	2	3	9	0	11	0	0
1	171	184	2	1	11	3	2	3	9	0	10	0	0
1	171	185	2	3	11	3	2	2	9	0	10	0	0
1	170	305	3	3	12	3	1	1	9	0	10	0	0
1	170	307	3	1	12	3	1	1	9	2	12	10	1.041393
1	170	309	3	1	1	3	2	2	10	1	10	6	0.845098
1	170	311	3	1	1	3	1	1	10	0	10	0	0
1	170	138	2	1	2	4	1	1	10	0	10	0	0
1	170	141	2	1	2	4	1	1	10	0	10	0	0
2	8	199	2	2	3	4	3	1	10	0	12	0	0
2	8	200	2	1	3	4	3	3	10	1	12	5	0.778151
2	9	141	2	1	3	4	2	2	10	0	12	0	0
2	9	143	2	1	3	4	2	2	10	0	12	0	0
1	166	200	2	1	3	4	1	2	10	1	10	6	0.845098
1	170	143	2	1	3	4	2	2	10	1	10	6	0.845098
2	5	25	1	3	4	4	2	2	10	1	12	5	0.778151
2	6	247	3	1	4	4	2	2	10	0	12	0	0
2	6	248	3	1	4	4	2	2	10	2	12	10	1.041393
2	7	238	3	3	4	4	1	1	10	0	12	0	0
2	7	305	3	1	4	4	1	1	10	0	12	0	0
2	8	197	2	3	4	4	3	2	10	0	12	0	0
2	8	198	2	3	4	4	3	3	10	1	12	5	0.778151
2	9	138	2	1	4	4	2	3	10	0	12	0	0
1	163	14	1	1	4	4	2	2	10	2	8	15	1.20412
1	163	20	1	2	4	4	2	2	10	0	10	0	0
1	163	21	1	2	4	4	2	1	10	0	10	0	0
1	164	91	1	1	4	4	1	1	10	0	10	0	0
1	166	198	2	2	4	4	1	3	10	0	11	0	0
1	166	199	2	2	4	4	1	2	10	0	10	0	0

1	168	233	3	3	4	4	1	1	10	2	10	12	1.113943
1	168	234	3	1	4	4	1	1	10	0	10	0	0
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2	5	14	1	1	5	1	3	2	10	0	12	0	0
2	5	20	1	2	5	1	3	2	10	0	12	0	0
2	5	21	1	2	5	1	3	2	10	1	12	5	0.778151
2	6	235	3	3	5	1	2	3	10	0	12	0	0
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2	6	244	3	3	5	1	2	2	10	0	12	0	0
2	7	309	3	1	5	1	1	2	10	0	12	0	0
2	8	194	2	1	5	1	2	2	10	0	12	0	0
2	8	195	2	1	5	1	3	2	10	1	12	5	0.778151
2	16	263	3	1	5	1	1	1	10	0	12	0	0
1	163	330	1	1	5	1	2	2	10	3	8	22.5	1.371068
1	164	88	1	1	5	1	1	2	10	3	10	18	1.278754
1	164	89	1	1	5	1	1	1	10	0	10	0	0
1	164	90	1	1	5	1	1	1	10	0	10	0	0
1	165	267	3	1	5	1	1	1	10	2	10	12	1.113943
1	165	268	3	1	5	1	1	1	10	1	10	6	0.845098
1	166	194	2	1	5	1	1	3	10	1	10	6	0.845098
1	166	195	2	1	5	1	1	3	10	1	10	6	0.845098
1	166	197	2	1	5	1	1	2	10	0	11	0	0
2	5	4	1	1	6	1	3	3	10	0	12	0	0
2	5	5	1	2	6	1	3	3	10	0	12	0	0
2	5	9	1	1	6	1	3	2	10	0	12	0	0
2	6	233	3	3	6	1	2	2	10	0	12	0	0
2	6	234	3	3	6	1	2	3	10	0	12	0	0
2	7	307	3	1	6	1	1	2	10	0	12	0	0
2	7	311	3	1	6	1	1	2	10	0	12	0	0
2	15	318	2	1	6	1	1	3	10	0	12	0	0
2	15	327	2	1	6	1	1	1	10	0	12	0	0
2	15	329	2	1	6	1	3	1	10	0	12	0	0
2	16	260	3	1	6	1	1	2	10	0	12	0	0

2	16	266	3	1	6	1	1	1	10	1	12	5	0.778151
2	16	267	3	1	6	1	1	1	10	1	12	5	0.778151
2	16	268	3	2	6	1	1	1	10	1	12	5	0.778151
2	17	87	1	1	6	1	3	3	10	0	12	0	0
2	17	89	1	1	6	1	3	3	10	0	12	0	0
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2	17	91	1	1	6	1	3	3	10	0	12	0	0
2	17	93	1	1	6	1	3	3	10	0	12	0	0
2	18	32	1	3	6	1	1	1	10	0	12	0	0
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1	157	32	1	2	6	1	3	3	10	0	16	0	0
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1	157	38	1	2	6	1	3	3	10	0	14	0	0
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1	163	4	1	1	6	1	2	2	10	0	8	0	0
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1	165	257	3	1	6	1	1	1	10	1	10	6	0.845098
1	165	260	3	1	6	1	1	1	10	2	12	10	1.041393
1	165	263	3	1	6	1	1	1	10	0	11	0	0
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2	14	184	2	1	7	1	1	2	10	0	12	0	0
2	14	185	2	1	7	1	1	2	10	0	12	0	0
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2	17	86	1	1	7	1	3	3	10	0	12	0	0
2	17	88	1	1	7	1	3	3	10	0	12	0	0
2	18	35	1	3	7	1	1	1	10	0	12	0	0
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1	157	25	1	3	7	1	3	3	10	0	15	0	0
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1	164	85	1	1	7	1	1	2	10	0	10	0	0
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2	17	85	1	1	8	2	3	3	10	0	12	0	0
2	18	243	3	1	8	2	2	2	10	0	12	0	0
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1	158	238	3	3	8	2	3	3	10	0	20	0	0
1	161	318	2	1	8	2	2	2	10	0	8	0	0
1	161	327	2	3	8	2	2	2	10	1	8	7.5	0.929419
1	161	329	2	1	8	2	2	2	10	1	11	5.5	0.809866
1	171	289	3	1	8	2	1	2	10	0	11	0	0
1	161	319	2	1	9	2	2	2	10	0	11	0	0
1	171	66	1	1	9	2	2	2	10	1	10	6	0.845098
1	171	243	3	1	9	2	1	2	10	0	10	0	0
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1	171	63	1	1	10	2	2	3	10	0	11	0	0
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1	170	305	3	3	12	3	1	1	10	1	10	6	0.845098
1	170	307	3	1	12	3	1	1	10	1	12	5	0.778151
1	170	309	3	1	1	3	2	2	11	3	10	18	1.278754
1	170	311	3	1	1	3	1	1	11	1	10	6	0.845098
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1	166	200	2	1	3	4	1	2	11	0	10	0	0
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2	5	25	1	3	4	4	2	2	11	0	12	0	0

2	6	247	3	1	4	4	2	2	11	0	12	0	0
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2	7	238	3	3	4	4	1	1	11	0	12	0	0
2	7	305	3	1	4	4	1	1	11	0	12	0	0
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2	16	263	3	1	5	1	1	1	11	0	12	0	0
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1	164	88	1	1	5	1	1	2	11	0	10	0	0
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1	164	90	1	1	5	1	1	1	11	0	10	0	0
1	165	267	3	1	5	1	1	1	11	1	10	6	0.845098
1	165	268	3	1	5	1	1	1	11	0	10	0	0
1	166	194	2	1	5	1	1	3	11	3	10	18	1.278754

1	166	195	2	1	5	1	1	3	11	0	10	0	0
1	166	197	2	1	5	1	1	2	11	0	11	0	0
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2	5	9	1	1	6	1	3	2	11	0	12	0	0
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2	7	307	3	1	6	1	1	2	11	0	12	0	0
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2	15	318	2	1	6	1	1	3	11	0	12	0	0
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2	16	260	3	1	6	1	1	2	11	1	12	5	0.778151
2	16	266	3	1	6	1	1	1	11	0	12	0	0
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2	16	268	3	2	6	1	1	1	11	0	12	0	0
2	17	87	1	1	6	1	3	3	11	0	12	0	0
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2	17	90	1	1	6	1	3	3	11	0	12	0	0
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2	17	93	1	1	6	1	3	3	11	0	12	0	0
2	18	32	1	3	6	1	1	1	11	1	12	5	0.778151
2	18	33	1	3	6	1	1	1	11	0	12	0	0
1	157	32	1	2	6	1	3	3	11	0	16	0	0
1	157	33	1	2	6	1	3	3	11	0	15	0	0
1	157	35	1	3	6	1	3	3	11	0	13	0	0
1	157	38	1	2	6	1	3	3	11	0	14	0	0
1	158	249	3	1	6	1	3	3	11	2	28	4.3	0.723104
1	163	4	1	1	6	1	2	2	11	1	8	7.5	0.929419
1	163	7	1	1	6	1	2	2	11	0	8	0	0
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1	164	86	1	1	6	1	2	2	11	0	10	0	0
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1	165	257	3	1	6	1	1	1	11	21	10	126	2.103804
1	165	260	3	1	6	1	1	1	11	8	12	40	1.612784
1	165	263	3	1	6	1	1	1	11	1	11	5.5	0.809866
1	165	266	3	1	6	1	1	1	11	2	12	10	1.041393
1	166	187	2	1	6	1	1	2	11	0	10	0	0
2	14	184	2	1	7	1	1	2	11	0	12	0	0
2	14	185	2	1	7	1	1	2	11	0	12	0	0
2	14	187	2	1	7	1	1	2	11	0	12	0	0
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2	17	86	1	1	7	1	3	3	11	0	12	0	0
2	17	88	1	1	7	1	3	3	11	0	12	0	0
2	18	35	1	3	7	1	1	1	11	0	12	0	0
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1	157	25	1	3	7	1	3	3	11	0	15	0	0
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1	158	248	3	1	7	1	3	3	11	0	23	0	0
1	164	85	1	1	7	1	1	2	11	0	10	0	0
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2	17	85	1	1	8	2	3	3	11	0	12	0	0
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1	161	318	2	1	8	2	2	2	11	4	8	30	1.491362
1	161	327	2	3	8	2	2	2	11	0	8	0	0
1	161	329	2	1	8	2	2	2	11	0	11	0	0
1	171	289	3	1	8	2	1	2	11	0	11	0	0
1	161	319	2	1	9	2	2	2	11	0	11	0	0
1	171	66	1	1	9	2	2	2	11	0	10	0	0
1	171	243	3	1	9	2	1	2	11	0	10	0	0
1	171	246	3	3	9	2	1	2	11	0	10	0	0
1	171	63	1	1	10	2	2	3	11	0	11	0	0
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1	170	305	3	3	12	3	1	1	11	1	10	6	0.845098
1	170	307	3	1	12	3	1	1	11	0	12	0	0
1	170	309	3	1	1	3	2	2	12	2	10	12	1.113943
1	170	311	3	1	1	3	1	1	12	0	10	0	0
1	170	138	2	1	2	4	1	1	12	32	10	192	2.285557
1	170	141	2	1	2	4	1	1	12	0	10	0	0
2	8	199	2	2	3	4	3	1	12	0	12	0	0
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2	9	141	2	1	3	4	2	2	12	35	12	175	2.245513
2	9	143	2	1	3	4	2	2	12	9	12	45	1.662758
1	166	200	2	1	3	4	1	2	12	0	10	0	0
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2	5	25	1	3	4	4	2	2	12	11	12	55	1.748188
2	6	247	3	1	4	4	2	2	12	0	12	0	0
2	6	248	3	1	4	4	2	2	12	1	12	5	0.778151
2	7	238	3	3	4	4	1	1	12	0	12	0	0
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2	8	198	2	3	4	4	3	3	12	1	12	5	0.778151
2	9	138	2	1	4	4	2	3	12	0	12	0	0
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1	163	20	1	2	4	4	2	2	12	0	10	0	0
1	163	21	1	2	4	4	2	1	12	0	10	0	0
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1	166	198	2	2	4	4	1	3	12	1	11	5.5	0.809866
1	166	199	2	2	4	4	1	2	12	0	10	0	0
1	168	233	3	3	4	4	1	1	12	0	10	0	0
1	168	234	3	1	4	4	1	1	12	0	10	0	0
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2	5	20	1	2	5	1	3	2	12	1	12	5	0.778151
2	5	21	1	2	5	1	3	2	12	0	12	0	0
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2	8	194	2	1	5	1	2	2	12	3	12	15	1.20412
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2	16	263	3	1	5	1	1	1	12	1	12	5	0.778151
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1	164	88	1	1	5	1	1	2	12	30	10	180	2.257679
1	164	89	1	1	5	1	1	1	12	23	10	138	2.143015
1	164	90	1	1	5	1	1	1	12	5	10	30	1.491362
1	165	267	3	1	5	1	1	1	12	0	10	0	0
1	165	268	3	1	5	1	1	1	12	6	10	36	1.568202
1	166	194	2	1	5	1	1	3	12	3	10	18	1.278754
1	166	195	2	1	5	1	1	3	12	0	10	0	0
1	166	197	2	1	5	1	1	2	12	0	11	0	0
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2	7	307	3	1	6	1	1	2	12	5	12	25	1.414973
2	7	311	3	1	6	1	1	2	12	4	12	20	1.322219
2	15	318	2	1	6	1	1	3	12	0	12	0	0
2	15	327	2	1	6	1	1	1	12	9	12	45	1.662758
2	15	329	2	1	6	1	3	1	12	0	12	0	0
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2	16	266	3	1	6	1	1	1	12	0	12	0	0
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2	17	87	1	1	6	1	3	3	12	10	12	50	1.70757
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2	17	90	1	1	6	1	3	3	12	24	12	120	2.082785
2	17	91	1	1	6	1	3	3	12	4	12	20	1.322219

2	17	93	1	1	6	1	3	3	12	15	12	75	1.880814
2	18	32	1	3	6	1	1	1	12	11	12	55	1.748188
2	18	33	1	3	6	1	1	1	12	5	12	25	1.414973
1	157	32	1	2	6	1	3	3	12	38	16	142.5	2.156852
1	157	33	1	2	6	1	3	3	12	75	15	300	2.478566
1	157	35	1	3	6	1	3	3	12	40	13	184.6	2.268614
1	157	38	1	2	6	1	3	3	12	13	14	55.7	1.753692
1	158	249	3	1	6	1	3	3	12	1	28	2.1	0.497325
1	163	4	1	1	6	1	2	2	12	47	8	352.5	2.548389
1	163	7	1	1	6	1	2	2	12	2	8	15	1.20412
1	163	9	1	1	6	1	2	2	12	0	8	0	0
1	164	86	1	1	6	1	2	2	12	23	10	138	2.143015
1	164	87	1	1	6	1	1	1	12	5	10	30	1.491362
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1	165	260	3	1	6	1	1	1	12	5	12	25	1.414973
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1	165	266	3	1	6	1	1	1	12	2	12	10	1.041393
1	166	187	2	1	6	1	1	2	12	2	10	12	1.113943
2	14	184	2	1	7	1	1	2	12	0	12	0	0
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2	17	86	1	1	7	1	3	3	12	4	12	20	1.322219
2	17	88	1	1	7	1	3	3	12	10	12	50	1.70757
2	18	35	1	3	7	1	1	1	12	4	12	20	1.322219
2	18	38	1	2	7	1	1	1	12	4	12	20	1.322219
1	157	25	1	3	7	1	3	3	12	6	15	24	1.39794
1	158	241	3	1	7	1	3	3	12	0	21	0	0
1	158	248	3	1	7	1	3	3	12	0	23	0	0
1	164	85	1	1	7	1	1	2	12	6	10	36	1.568202
1	164	93	1	1	7	1	2	3	12	49	10	294	2.469822
2	17	85	1	1	8	2	3	3	12	3	12	15	1.20412
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1	161	318	2	1	8	2	2	2	12	1	8	7.5	0.929419
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1	171	66	1	1	9	2	2	2	12	5	10	30	1.491362
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1	171	184	2	1	11	3	2	3	12	18	10	108	2.037426
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1	170	305	3	3	12	3	1	1	12	0	10	0	0
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2	8	199	2	2	3	4	3	1	17	0	12	0	0
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2	9	141	2	1	3	4	2	2	17	2	12	10	1.041393
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1	164	88	1	1	5	1	1	2	17	0	10	0	0
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1	168	233	3	3	4	4	1	1	20	0	10	0	0

1	168	234	3	1	4	4	1	1	20	0	10	0	0
1	168	235	3	3	4	4	1	1	20	0	10	0	0
2	5	14	1	1	5	1	3	2	20	5	12	25	1.414973
2	5	20	1	2	5	1	3	2	20	0	12	0	0
2	5	21	1	2	5	1	3	2	20	0	12	0	0
2	6	235	3	3	5	1	2	3	20	0	12	0	0
2	6	241	3	1	5	1	2	3	20	0	12	0	0
2	6	244	3	3	5	1	2	2	20	1	12	5	0.778151
2	7	309	3	1	5	1	1	2	20	0	12	0	0
2	8	194	2	1	5	1	2	2	20	0	12	0	0
2	8	195	2	1	5	1	3	2	20	0	12	0	0
2	16	263	3	1	5	1	1	1	20	0	12	0	0
1	163	330	1	1	5	1	2	2	20	0	8	0	0
1	164	88	1	1	5	1	1	2	20	0	10	0	0
1	164	89	1	1	5	1	1	1	20	0	10	0	0
1	164	90	1	1	5	1	1	1	20	0	10	0	0
1	165	267	3	1	5	1	1	1	20	2	10	12	1.113943
1	165	268	3	1	5	1	1	1	20	0	10	0	0
1	166	194	2	1	5	1	1	3	20	0	10	0	0
1	166	195	2	1	5	1	1	3	20	0	10	0	0
1	166	197	2	1	5	1	1	2	20	0	11	0	0
2	5	4	1	1	6	1	3	3	20	0	12	0	0
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2	6	233	3	3	6	1	2	2	20	0	12	0	0
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2	7	307	3	1	6	1	1	2	20	0	12	0	0
2	7	311	3	1	6	1	1	2	20	0	12	0	0
2	15	318	2	1	6	1	1	3	20	0	12	0	0
2	15	327	2	1	6	1	1	1	20	0	12	0	0
2	15	329	2	1	6	1	3	1	20	0	12	0	0
2	16	260	3	1	6	1	1	2	20	0	12	0	0
2	16	266	3	1	6	1	1	1	20	0	12	0	0

2	16	267	3	1	6	1	1	1	20	0	12	0	0
2	16	268	3	2	6	1	1	1	20	0	12	0	0
2	17	87	1	1	6	1	3	3	20	0	12	0	0
2	17	89	1	1	6	1	3	3	20	0	12	0	0
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2	17	91	1	1	6	1	3	3	20	0	12	0	0
2	17	93	1	1	6	1	3	3	20	0	12	0	0
2	18	32	1	3	6	1	1	1	20	0	12	0	0
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1	157	32	1	2	6	1	3	3	20	0	16	0	0
1	157	33	1	2	6	1	3	3	20	0	15	0	0
1	157	35	1	3	6	1	3	3	20	0	13	0	0
1	157	38	1	2	6	1	3	3	20	0	14	0	0
1	158	249	3	1	6	1	3	3	20	0	28	0	0
1	163	4	1	1	6	1	2	2	20	0	8	0	0
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1	164	86	1	1	6	1	2	2	20	0	10	0	0
1	164	87	1	1	6	1	1	1	20	0	10	0	0
1	165	257	3	1	6	1	1	1	20	0	10	0	0
1	165	260	3	1	6	1	1	1	20	0	12	0	0
1	165	263	3	1	6	1	1	1	20	0	11	0	0
1	165	266	3	1	6	1	1	1	20	0	12	0	0
1	166	187	2	1	6	1	1	2	20	0	10	0	0
2	14	184	2	1	7	1	1	2	20	0	12	0	0
2	14	185	2	1	7	1	1	2	20	0	12	0	0
2	14	187	2	1	7	1	1	2	20	0	12	0	0
2	15	319	2	1	7	1	1	2	20	0	12	0	0
2	17	86	1	1	7	1	3	3	20	0	12	0	0
2	17	88	1	1	7	1	3	3	20	0	12	0	0
2	18	35	1	3	7	1	1	1	20	0	12	0	0
2	18	38	1	2	7	1	1	1	20	0	12	0	0
1	157	25	1	3	7	1	3	3	20	0	15	0	0

1	158	241	3	1	7	1	3	3	20	0	21	0	0
1	158	248	3	1	7	1	3	3	20	0	23	0	0
1	164	85	1	1	7	1	1	2	20	0	10	0	0
1	164	93	1	1	7	1	2	3	20	0	10	0	0
2	17	85	1	1	8	2	3	3	20	0	12	0	0
2	18	243	3	1	8	2	2	2	20	0	12	0	0
2	18	249	3	1	8	2	3	2	20	0	12	0	0
1	158	238	3	3	8	2	3	3	20	0	20	0	0
1	161	318	2	1	8	2	2	2	20	0	8	0	0
1	161	327	2	3	8	2	2	2	20	0	8	0	0
1	161	329	2	1	8	2	2	2	20	0	11	0	0
1	171	289	3	1	8	2	1	2	20	0	11	0	0
1	161	319	2	1	9	2	2	2	20	0	11	0	0
1	171	66	1	1	9	2	2	2	20	0	10	0	0
1	171	243	3	1	9	2	1	2	20	7	10	42	1.633468
1	171	246	3	3	9	2	1	2	20	0	10	0	0
1	171	63	1	1	10	2	2	3	20	0	11	0	0
1	171	184	2	1	11	3	2	3	20	0	10	0	0
1	171	185	2	3	11	3	2	2	20	0	10	0	0
1	170	305	3	3	12	3	1	1	20	0	10	0	0